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ABSTRACT

This document presents a statistical study of hospital use by children in the United States and Canada designed to determine why the hospital discharge rate of children in the United States is lower than many other Western industrialized nations, although the discharge rate for the general U.S. population is higher. Several reasons for the lower rate are suggested, including the possibilities that American children are in better health, fewer children are hospitalized unnecessarily in the United States, or some children are not receiving needed hospital care. A comparison of Canadian and U.S. statistics is included because of the two countries' similar hospital structure and data. Data are presented in three areas. Hospital use is compared using data on age and sex, diagnosis, surgical procedures, newborn infants, and hospital fatalities. Health status is compared using morbidity, mortality, and cause of death data. Health services are compared using supply and distribution of resources, physician utilization, and health insurance data. It is concluded that: (1) children in the United States had lower discharge rates for upper respiratory infections but higher infant mortality; (2) ambulatory care appeared to be used more in the United States than in Canada; and (3) more U.S. children were uninsured than were Canadian children. A 1983 statistical update is included. (ABL)

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Hospital Use by Children in the United States and Canada

Comparative International Vital and Health Statistics Reports
Series 5, No. 1

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VITAL AND HEALTH STATISTICS

Hospital Use by Children in the United States and Canada

The hospital discharge rate of children under 15 years of age is lower in the United States than in many other countries. This comparison of children's hospital use in the United States and Canada explores possible reasons for the relatively low discharge rate of U.S. children. Discharge rates are compared by age, sex, diagnosis, and surgical procedure. Morbidity and mortality rates are examined for indications that U.S. children are in better health than Canadian children and thus are less likely to need hospitalization. Characteristics of the health services systems in the two countries are investigated for evidence that ambulatory care is substituted for inpatient care in the treatment of U.S. children or that U.S. children have greater problems obtaining access to hospital care than Canadian children.

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Series 5, No. 1

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Symbols

. . .	Data not available
. .	Category not applicable
-	Quantity zero
0.0	Quantity more than zero but less than 0.05
Z	Quantity more than zero but less than 500 where numbers are rounded to thousands
*	Figure does not meet standards of reliability or precision
e	Figure suppressed to comply with confidentiality requirements

Hospital Use by Children in the United States and Canada

by Lola Jean Kozak and Eileen McCarthy,
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Introduction

The United States has a hospital discharge rate higher than many other Western industrialized countries. In 1980 there were 170 discharges per 1,000 population in the United States.[1] Recent discharge rates reported by other countries include 161 discharges per 1,000 population in Denmark,[2,a] 149 in Canada,[3] 129 in New Zealand,[4,b] 106 in England and Wales,[5,b] and 101 in the Netherlands.[6,a] Australia is one of the few countries that reports a higher discharge rate than the United States, 181 per 1,000 population.[7] However, the discharge rates of children under 15 years of age are higher in all of these countries than in the United States. The 1980 discharge rate for U.S. children under 15 years of age was 67 per 1,000 population. In Australia there were 126 discharges of children under 15 years of age per 1,000 population, in Denmark 92,[a] in Canada 97, in New Zealand 95, in England and Wales 77, and in the Netherlands 75.[a]

The high total discharge rate for the United States has been explored in a number of comparative studies,[8–11] but little attention has been paid to the low discharge rate of U.S. children. It is not clear whether the low children's discharge rate should be considered a positive finding or a subject of concern. The low rate could be interpreted as an indication that U.S. children are in better health than children in other countries or that fewer children are hospitalized unnecessarily in the United States. However, the low rate could also suggest that some U.S. children do not receive hospital care when they need it.

This comparison of hospital use by children in the United States and Canada was undertaken to explore the reasons for the relatively low discharge rate of U.S. children. Canada was considered especially appropriate for the comparison because of the many similarities between the U.S. and Canadian health services systems.[12] Both countries have health care programs that are the joint concern of the Federal and State or Provincial governments. While Canada has a national health insurance program and the United States does not, both countries have active private sectors within their health care systems. Most physicians in the two countries are in private practice and are paid on a fee-for-service basis. Most U.S. and Canadian hospitals are locally controlled; nonprofit; and, unlike most European hospitals, open staffed: Physicians not employed by the hospitals can admit and follow their private patients.

Canada was also chosen for the comparison because its hospital data were more comparable with U.S. data than were the hospital data from other countries. While U.S. data were for short-stay hospital discharges, the hospital discharge data available from other countries included patients treated in both long- and short-stay hospitals. However, for Canada it was possible to obtain special tabulations of data on short-stay hospital discharges. In addition, the same adaptation of the International Classification of Diseases (ICD) was used to code discharge diagnoses and surgical procedures in Canada and the United States. Other countries used somewhat different versions of the ICD to code diagnoses and frequently followed a separate coding system for surgical procedures.[13,14]

Outline of study

There were three main components to the comparison, each of which makes up a section of this report. First, children's hospital use was examined in detail to determine whether the U.S.-Canadian difference in children's discharge rate was pervasive or limited to a few categories of children. Discharge rates were compared by age, sex, diagnosis, and surgical procedure. Attention was also given to newborn infants, whose discharges were not included in the discharge rates of children in either Canada or the United States.

The second component of the study was an exploration of the health status of U.S. and Canadian children. Mortality and morbidity rates were compared by age and sex for indications that U.S. children were in better health than Canadian children and thus were less likely to need hospitalization. Children's mortality rates for selected causes of death were also examined for evidence that differences in the incidence or severity of specific conditions could account for variations in the discharge rates for the conditions.

The third component of the study was a comparison of aspects of the health services systems in the United States and Canada to examine two possible explanations of the lower level of children's hospital use in the United States. One possible explanation is that U.S. children rely on ambulatory care for conditions that are treated on an inpatient basis in Canada. Because of the costs of hospital care and because hospitalization can result in emotional problems in children, the treatment of children on an ambulatory basis whenever possible has frequently been urged in the United States.[15–17] Previous U.S.

[a]Published data were adjusted to exclude newborn infants.
[b]Data exclude maternity patients.

studies have indicated that increases in the use of ambulatory care contribute to declines in hospitalization.[18,19] A second possible explanation of U.S. children's lower discharge rates is that U.S. children have greater problems obtaining access to hospital care than Canadian children,[20] and, as a result, some U.S. children do not receive needed inpatient treatment. To investigate these possible explanations, the supply and distribution of hospital beds and physicians in the United States and Canada were examined. Physician utilization in the two countries was compared, and the health insurance coverage of the two populations was explored.

Data sources

The data compared in the study were primarily for 1978. When the study was undertaken, the 1978 hospital discharge data were the most recent available to the authors for Canada. More recent discharge data have been published in both countries.[1,21]

The discharge data for the United States were collected in the National Hospital Discharge Survey, a continuous voluntary survey conducted by the National Center for Health Statistics since 1965. Information for the survey was obtained from the medical records of a sample of patients discharged from a national sample of general and special short-stay hospitals, excluding Federal hospitals. The sample for 1978 included approximately 219,000 medical records from 413 hospitals. A detailed report on the design of the National Hospital Discharge Survey has been published.[22] Appendix I contains a further description of the survey and each of the other data sources used in the study. Appendix II presents definitions of the terms used in this report.

The Canadian discharge data were from the Health Division of Statistics Canada, which has compiled data on discharges from general and allied special hospitals in Canada since 1960. Except for a small number of patients whose hospitalizations were not paid for by the national insurance program, data were collected on each individual discharge rather than a sample of discharges. The general and allied special hospitals include acute care, convalescence, and chronic hospitals, but data used in this study were only for discharges from the short-stay hospitals, unless otherwise noted. Published reports provide detailed descriptions of the Canadian discharge data system.[13,23]

The mortality data for the United States were obtained from the Division of Vital Statistics, National Center for Health Statistics, which receives information on all death records from the States and the District of Columbia. The main source was *Vital Statistics of the United States, 1978*,[24] but unpublished tabulations were also consulted.

The U.S. death rates, as well as the discharge rates based on the National Hospital Discharge Survey, were computed using estimates of the 1978 population revised in light of the 1980 U.S. census,[25] and thus differ from previously published rates.

Canadian mortality data were obtained from the Health Division, Statistics Canada, publications *Vital Statistics, 1978*[26] and *Causes of Death, 1978*,[27] which were based on data from all death records collected by the Provinces and Territories. Death rates and discharge rates were computed using estimates of the 1978 population revised after the 1981 Canadian Census.[28]

The U.S. National Health Interview Survey was the source of data on bed and disability days, restricted activity, physician utilization, and health insurance coverage in the United States. The survey, conducted by the National Center for Health Statistics since 1957, covers the civilian noninstitutionalized population of the United States. Data for approximately 110,000 persons in 40,000 households are collected for the survey each year in interviews conducted throughout the year. Descriptions of data collection, field procedures, and questionnaire development in the National Health Interview Survey have been published,[29,30] as have detailed discussions of the sample design and estimation procedures.[31,32]

Data from the Canada Health Survey were compared with the U.S. data. Statistics Canada and the Department of National Health and Welfare were responsible for the Canada Health Survey, which was conducted nationally from July 1978 through March 1979. The survey covered approximately 97 percent of the noninstitutionalized population of the country; the 3 percent excluded were persons in the Territories, on Indian Reservations, and in certain remote areas. Data for a total of 31,668 persons in 10,571 households were collected during the survey. A description of the survey has been published.[33]

Data on hospital beds in the United States were taken from the American Hospital Association's *Hospital Statistics*.[34] The Canadian bed data came from the Health Division of Statistics Canada, both from the Health Division's publication, *Hospital Annual Statistics, 1977–78*,[35] and a special tabulation of data on short-stay hospitals. In both countries, the data were collected by means of an annual questionnaire filled out by the individual hospitals. The U.S. data used in the study were for short-stay non-Federal hospitals registered with the American Hospital Association, but questionnaires were also completed by the long-stay, Federal, and nonregistered hospitals. The Canadian questionnaires were sent to all general and allied special hospitals, but data from the convalescence and chronic care hospitals were excluded from this study.

The main sources of physician data for the United States were the American Medical Association's *Physician Distribution and Medical Licensure in the U.S., 1978*[36] and "Medical Education in the United States, 1977–1978."[37] Canadian physician data were from the Department of National Health and Welfare publication *Canada Health Manpower Inventory, 1979*.[38] In both countries, continuously updated computer files that contain information on physician characteristics were the basis of the published reports. The information in the computer files was drawn from a variety of sources, including medical schools, medical associations, medical specialty organizations, hospitals, and periodic questionnaires sent to all physicians.

Data highlights

Hospital use

- For children under 15 years of age, the Canadian discharge rate was 44 percent higher than the U.S. rate.
- Canada had a longer average length of stay for every age group; Canadian children stayed in the hospital approximately 20 percent longer than U.S. children.
- The Canadian discharge rate for children under 15 years of age with respiratory diseases was 71 percent higher than the U.S. rate.
- Canada had a discharge rate more than 2½ times the U.S. rate for children under 15 years of age with upper respiratory infections.
- The discharge rate for children under 15 years of age with hypertrophy of tonsils and adenoids was 67 percent higher in Canada than in the United States.
- The rate of surgical discharges for children under 15 years of age was 21 percent higher in Canada than in the United States, but for persons 15 years of age and over, the difference in rates was not statistically significant.
- There was no significant difference in U.S. and Canadian surgical discharge rates for children under 15 years of age when the category tonsillectomy with or without adenoidectomy was excluded.
- The proportion of newborn infants who were not healthy was 16 percent higher in the United States than in Canada.
- Healthy newborn infants stayed in the hospital almost twice as long in Canada as in the United States.

Health status

- Children under 15 years of age had 28 percent more disability days and 44 percent more bed days in the United States than in Canada.
- The U.S. death rate was 14 percent higher than the Canadian rate for children under 1 year of age and 8 percent higher for those 1–4 years of age.
- The Canadian death rate was 15 percent higher than the U.S. rate for children 5–9 years of age and 6 percent higher for those 10–14 years of age.
- Death rates for respiratory diseases did not differ between the United States and Canada for children under 15 years of age.
- For congenital anomalies, Canadian children under 15 years of age had a 26 percent higher death rate than U.S. children and a 47 percent higher discharge rate.
- For certain causes of perinatal mortality and morbidity, U.S. children under 1 year of age had a higher mortality rate and a higher discharge rate than Canadian children.
- The highest neonatal mortality rates were for anoxic and hypoxic conditions, for which the U.S. rate was higher, and congenital anomalies, for which the Canadian rate was higher; however, the newborn infant discharge rates did not differ for either condition.
- Accidents accounted for approximately 40 percent of the deaths of the children in the 1–4 years age group and for over half of the deaths of those 5–14 years of age in the United States and Canada.

Health services

- Canada had a higher rate of total hospital beds and a rate of pediatric beds twice that in the United States.
- The rate of pediatricians was higher in the United States than in Canada.
- Discharge rates of children under 15 years of age were related to the rates of total hospital beds in the United States and to the rates of pediatric beds in Canada.
- There were inverse relationships between the rates of physicians and pediatricians and children's discharge rates in the United States.
- The percent of children under 15 years of age with a physician contact was the same in the United States and Canada, but U.S. children had a higher average number of contacts per person.
- While Canadians are virtually all covered by a nationwide hospital insurance program, no health insurance coverage was reported for 10 percent of the U.S. population and 12 percent of children under 5 years of age.
- Among U.S. children under 15 years of age in families with an average annual income less than $10,000, those without insurance coverage had a significantly lower rate of hospital episodes than those with coverage.

Hospital use

A detailed exploration of the patterns of hospital use in the United States and Canada could suggest possible explanations for the lower hospital discharge rate of U.S. children. If the lower U.S. rates were only found for a few categories of children (that is, for one age group, one sex, or a small number of diagnostic categories), then a specific difference between the United States and Canada in the incidence of certain diseases or in the usual medical practices associated with them would be suggested. However, if lower discharge rates were found for U.S. children across many age, sex, diagnostic, and surgical categories, the explanation would probably be a more general characteristic of the countries, such as the health status of the children or the accessibility of children's health services.

Age and sex

The 1978 discharge rates for short-stay hospital patients in the United States and Canada are shown by age and sex in table A and by age in figure 1. The total discharge rate was 8 percent higher in the United States, but for children under 15 years of age, the Canadian discharge rate was 44 percent higher. The Canadian discharge rate was not higher than the U.S. rate for any other age group, though for two age groups, 25–34 years and 55–64 years, the differences in discharge rates between the two countries were not statistically significant. Among the age groups for which discharge rates were higher in the United States, the difference in rates varied from a 9-percent higher U.S. rate for the 15–24 years age group to a 22-percent higher U.S. rate for the 35–44 years age group.

The total discharge rates of males and females were higher in the United States, but the discharge rates of males and females under 15 years of age were higher in Canada. Some variations in discharge rates also existed for other age groups by sex. The discharge rates for males 15–24 years of age was 13 percent higher in the United States, and for males 25–34 years of age, the U.S. rate was 29 percent higher. Differences

Table A. Discharge rates and average lengths of stay for patients discharged from short-stay hospitals, by sex and age: United States and Canada, 1978

[Data are for non-Federal hospitals in the United States and for all short-stay hospitals in Canada. Data from both countries exclude newborn infants]

Age group	Both sexes		Male		Female	
	United States	Canada	United States	Canada	United States	Canada
	Rate per 10,000 population					
All ages	1,615	1,493	1,350	1,248	1,863	1,736
Under 15 years	671	965	733	1,073	607	851
15–24 years	1,358	1,242	782	691	1,922	1,805
25–34 years	1,678	1,579	924	717	2,399	2,448
35–44 years	1,521	1,249	1,208	925	1,816	1,581
45–54 years	1,735	1,471	1,627	1,391	1,836	1,551
55–64 years	2,070	1,923	2,192	2,121	1,962	1,742
65–74 years	2,979	2,719	3,328	3,117	2,712	2,382
75 years and over	4,461	4,043	5,012	4,765	4,151	3,579
	Average length of stay in days					
All ages	7.4	8.9	7.8	9.4	7.1	8.5
Under 15 years	4.4	5.3	4.5	5.3	4.4	5.3
15–24 years	4.7	5.6	6.0	6.5	4.2	5.2
25–34 years	5.1	6.0	6.4	7.0	4.7	5.7
35–44 years	6.5	7.7	6.8	8.0	6.3	7.4
45–54 years	7.8	9.5	7.8	9.6	7.8	9.5
55–64 years	9.1	11.5	8.9	11.3	9.2	11.7
65–74 years	10.4	13.8	10.1	13.4	10.7	14.3
75 years and over	11.5	18.4	11.0	17.0	11.9	19.7

NOTE: Data in this table differ slightly from those in the tables that follow. Discharges whose diagnoses were coded in the supplementary classifications, a section of the *Eighth Revision International Classification of Diseases, Adapted for Use in the United States* commonly referred to as V-codes, are only included in this table.

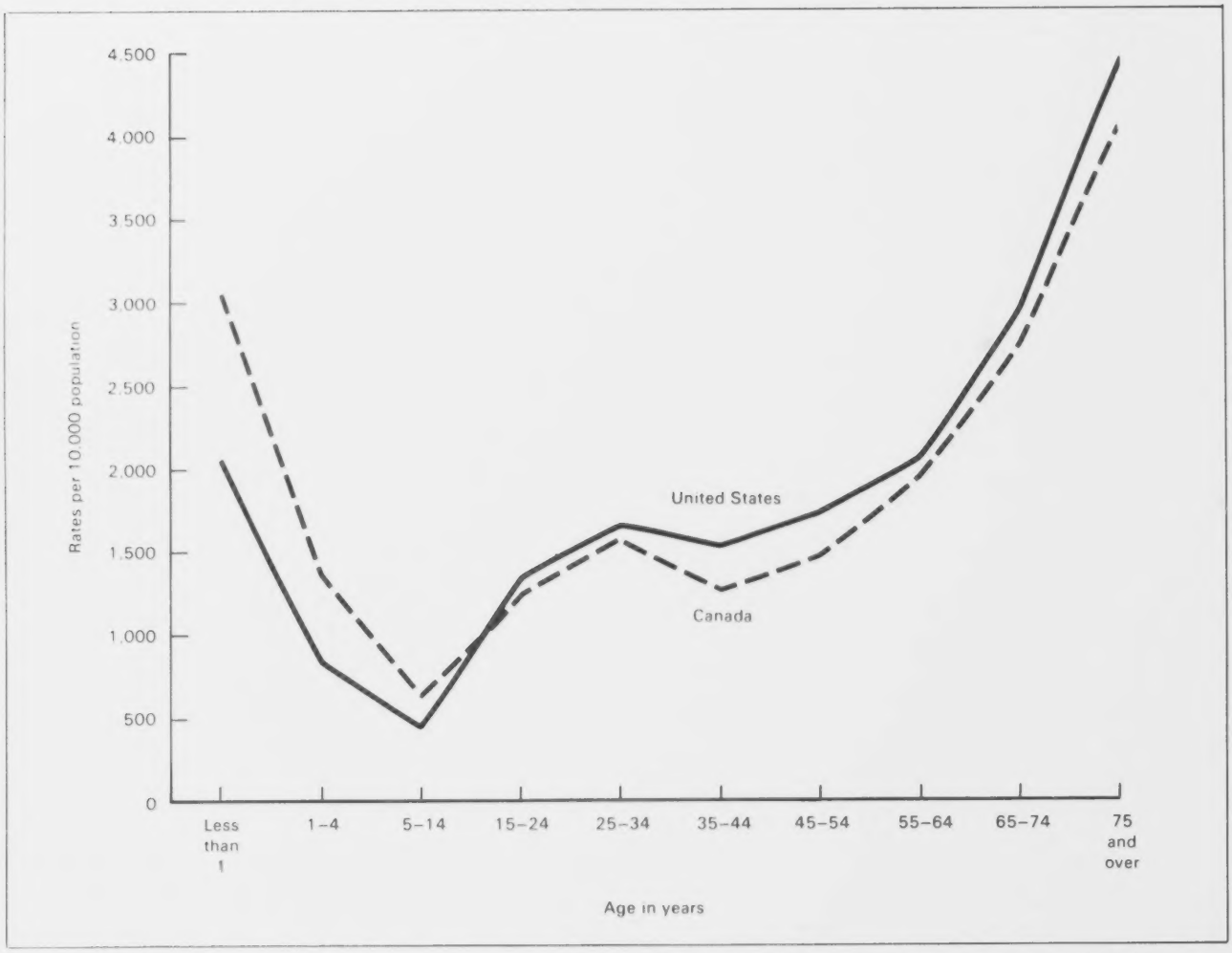

Figure 1. Rates per 10,000 population for patients, excluding newborn infants, discharged from short-stay hospitals, by age: United States and Canada, 1978

between the two countries in the discharge rates for females in these two age groups were not statistically significant. Conversely, the U.S.-Canadian differences in discharge rates for males in the three oldest age groups were not statistically significant. However, the discharge rates for females were higher in the United States: 13 percent for the 55–64 years age group, 14 percent for the 65–74 years age group, and 16 percent for the 75 years and over age group. The discharge rates for both males and females in the age groups 35–44 years and 45–54 years were higher in the United States.

The 1978 average lengths of stay for patients discharged from short-stay hospitals in the United States and Canada are shown in table A by age and sex and by age in figure 2. Canada's total average length of stay was 8.9 days, which was 1.5 days (20 percent) longer than the U.S. total average length of stay, and Canada had a longer average length of stay for each individual age group. Unlike the pattern for discharge rates, the difference in the average lengths of stay of U.S. and Canadian children under 15 years of age was the same as the difference for all ages: approximately 20 percent longer in Canada. The percent differences between the two countries in average lengths of stay for the age group 15–24 years through 45–54 years were also close to the differences in the total, with Canada's average length of stay 18–22 percent longer. For the three oldest age groups, the differences increased up to an average length of stay 6.9 days (60 percent) longer in Canada for patients 75 years of age and over.

The total average lengths of stay for both males and females were higher in Canada, and for most of the age groups, the U.S.-Canadian differences between average lengths of stay were similar for both sexes. One exception was the group 15–24 years of age, for which the average length of stay for females was 24 percent higher in Canada but the average length of stay for males was not significantly different between the two countries. In addition, for the group 25–34 years of age, the average length of stay in Canada was 21 percent higher for females but only 9 percent higher for males. A shorter average length of stay for childbirth in the United States may account for these contrasts.

Discharge rates and average lengths of stay for three age groups under 15 years are shown by sex in table B. The statistics in table B and subsequent tables are slightly different from those

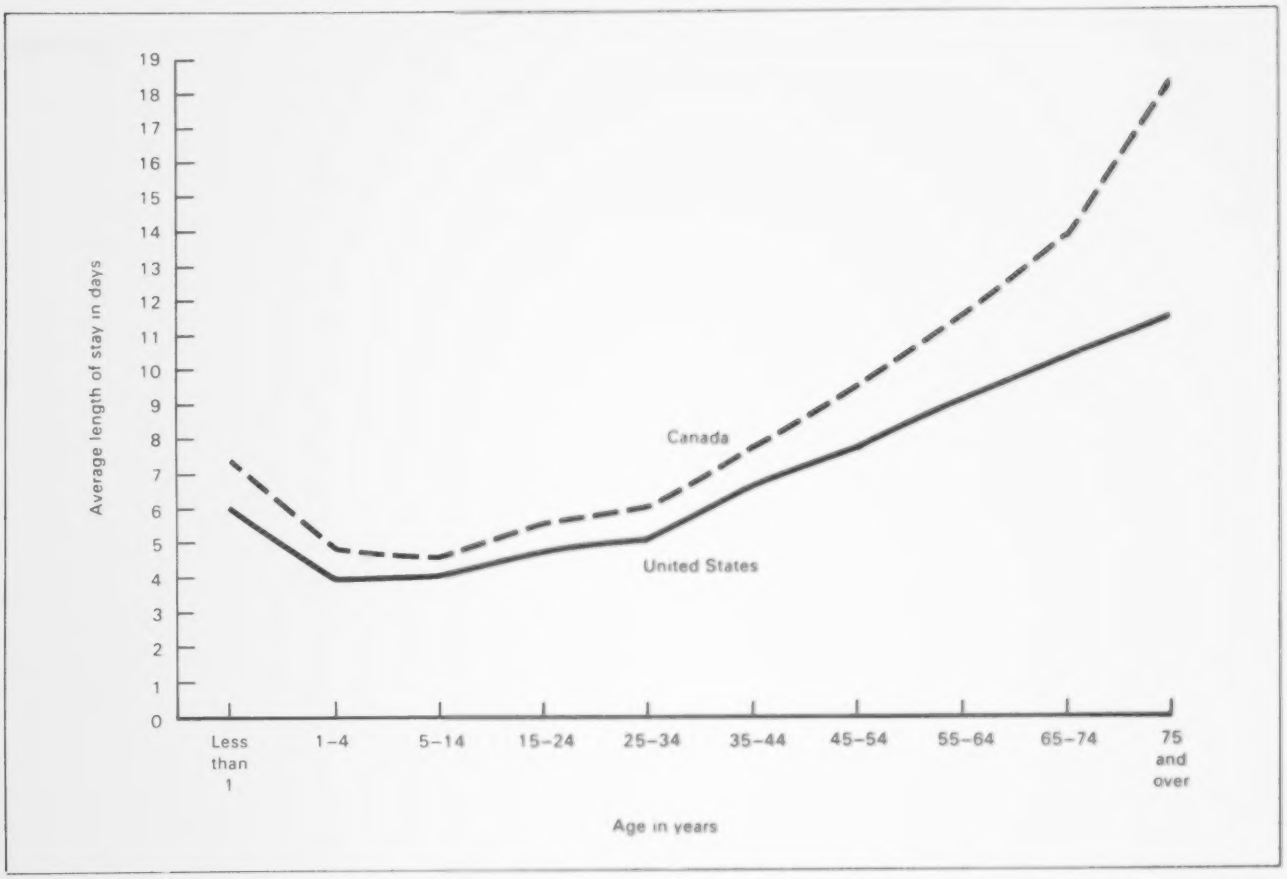

Figure 2. Average lengths of stay in days for patients, excluding newborn infants, discharged from short-stay hospitals, by age: United States and Canada, 1978

Table B. Discharge rates and average lengths of stay for patients under 15 years of age discharged from short-stay hospitals, by sex and age: United States and Canada, 1978

[Data are for non-Federal hospitals in the United States and for all short-stay hospitals in Canada. Data from both countries exclude newborn infants]

Age group	Both sexes		Male		Female	
	United States	Canada	United States	Canada	United States	Canada
	Rate per 10,000 population					
Under 15 years	666	953	728	1,061	601	839
Under 1 year	2,051	3,066	2,292	3,464	1,797	2,646
1–4 years	838	1,342	945	1,545	727	1,128
5–14 years	480	627	509	675	449	576
	Average length of stay in days					
Under 15 years	4.4	5.3	4.5	5.3	4.4	5.3
Under 1 year	6.0	7.5	5.7	7.4	6.3	7.7
1–4 years	4.0	4.8	4.0	4.7	4.0	5.0
5–14 years	4.1	4.6	4.3	4.7	3.9	4.6

in table A. The reason is that discharges whose diagnoses were coded in the supplementary classifications, a section of the *Eighth Revision International Classification of Diseases, Adapted for Use in the United States*[39] (ICDA-8) commonly referred to as the y-codes, are excluded from all but table A.

With the y-codes diagnoses excluded, the discharge rate for children under 15 years of age was 43 percent higher in Canada than in the United States. Higher discharge rates were found in Canada across all three age groups under 15 years. Canadian children under 1 year of age had a 49-percent higher

rate, those 1–4 years of age had a 60-percent higher rate, and those 5–14 years of age had a 31-percent higher discharge rate. In each of the three age groups, Canadian males had higher discharge rates than U.S. males, and Canadian females had higher discharge rates than U.S. females.

The average lengths of stay were also longer in Canada than in the United States for each of the three age groups under 15 years of age. Canadian children under 1 year of age stayed in hospitals 25 percent longer, those 1–4 years of age stayed 20 percent longer, and those 5–14 years of age stayed 12 percent longer. Canadian females in each age group had longer average lengths of stay than U.S. females. Males under 1 year of age and 1–4 years of age had longer average lengths of stay in Canada, but the difference between the two countries in the average length of stay for males 5–14 years of age was not statistically significant.

Diagnosis

Discharge rates

Detailed diagnostic data are presented for the United States and Canada in tables 1–3. Discharge rates of U.S. and Canadian patients under 15 years of age are shown for the 17 main diagnostic categories of the ICDA–8 in table C. Canadian patients under 15 had higher discharge rates for 8 of the 17 diagnostic categories. U.S. patients under 15 years had higher rates for three categories, and there were no significant differences in the rates for six of the categories. The categories for which the Canadian discharge rates were higher accounted for most of the discharges of children under 15 years, 82 percent in Canada and 74 percent in the United States. The categories in which U.S. discharge rates were higher accounted for only 3 percent of U.S. children's discharges and 1 percent of Canadian children's discharges.

In both Canada and the United States, the highest discharge rate for children under 15 years of age was for the category diseases of the respiratory system. The Canadian discharge rate for children with respiratory diseases was 71 percent higher than the U.S. rate. The diagnostic category with the second highest discharge rate for children in both countries was accidents, poisonings, and violence, for which Canada's discharge rate was 21 percent higher than the U.S. rate.

Children's discharge rates were also higher in Canada for all but one of the other diagnostic categories that accounted for sizable numbers of children's discharges in both countries. For infective and parasitic diseases, Canada's rate was 65 percent higher. The Canadian rate was 14 percent higher for diseases of the nervous system and sense organs. Canada had a 47 percent higher discharge rate for congenital anomalies, and a rate more than three times higher than the United States for symptoms and ill-defined conditions. However, for diseases of the digestive system, children's discharge rates in Canada and the United States were not significantly different.

Among the diagnostic categories that accounted for relatively few discharges of children under 15, the discharge rates in Canada were higher for two: endocrine, nutritional, and metabolic diseases; and diseases of the skin and subcutaneous tissue. U.S. discharge rates were higher for three: diseases of the circulatory system; complications of pregnancy, childbirth, and the puerperium; and certain conditions of perinatal morbidity and mortality. For the remaining five categories, neoplasms,

Table C. Discharge rates and average lengths of stay for patients discharged from short-stay hospitals, by age and diagnostic category: United States and Canada, 1978

[For the United States, data are for first-listed diagnosis in non-Federal hospitals. For Canada, data are for principal or primary diagnosis in all short-stay hospitals. Data from both countries exclude newborn infants and are coded using the *Eighth Revision International Classification of Diseases, Adapted for Use in the United States* (ICDA–8)]

Diagnostic category and ICDA–8 code		Under 15 years		15 years and over		Under 15 years		15 years and over	
		United States	Canada	United States	Canada	United States	Canada	United States	Canada
		Rate per 10,000 population				Average length of stay in days			
All conditions	000–999	666	953	1,881	1,611	4.4	5.3	7.7	9.7
Infective and parasitic diseases	000–139	57	94	32	25	3.9	5.8	6.5	9.0
Neoplasms	140–239	13	12	146	119	6.7	8.5	10.6	13.8
Endocrine, nutritional and metabolic diseases	240–279	12	18	53	33	7.0	8.8	9.1	13.0
Diseases of the blood and blood-forming organs	280–289	13	13	14	9	5.0	5.4	8.1	12.2
Mental disorders	290–319	9	9	100	81	13.7	17.5	11.2	16.2
Diseases of the nervous system and sense organs	320–389	59	67	73	63	3.3	4.8	6.5	9.6
Diseases of the circulatory system	390–459	8	4	280	204	10.5	8.7	10.2	14.5
Diseases of the respiratory system	460–519	210	359	144	111	3.6	4.3	7.5	8.5
Diseases of the digestive system	520–579	68	73	227	188	4.2	4.6	7.6	9.0
Diseases of the genitourinary system	580–629	34	37	190	153	3.6	5.3	5.9	7.0
Complications of pregnancy, childbirth, and the puerperium	630–676	4	2	251	277	2.9	4.2	3.5	5.0
Diseases of the skin and subcutaneous tissue	680–709	13	22	30	25	4.5	6.6	8.0	9.3
Diseases of the musculoskeletal system and connective tissue	710–739	14	16	104	86	6.3	8.5	8.8	10.5
Congenital anomalies	740–759	30	44	11	8	5.9	8.8	6.9	7.8
Certain conditions of perinatal morbidity	760–779	9	[illegible]	...	...	9.6	15.1	...	...
Symptoms and ill-defined conditions	780–799	20	[illegible]	33	80	3.5	4.4	4.3	7.2
Accidents, poisonings, and violence	800–999	95	[illegible]	193	149	4.8	5.0	8.2	9.9

diseases of the blood and blood-forming organs, mental disorders, diseases of the genitourinary system, and diseases of the musculoskeletal system and connective tissue, children's discharge rates in Canada and the United States were not significantly different.

The pattern of discharge rates in diagnostic categories was considerably different for patients 15 years of age and over than for those under 15 years of age (table C). The United States had higher discharge rates for the age group 15 years and over in 14 of the diagnostic categories. Canada had higher rates in two categories, and one category, certain causes of perinatal morbidity and mortality, was not applicable to patients 15 years of age and over. With one exception, discharge rates for patients 15 years of age and over were higher in the United States for all of the categories that accounted for sizable numbers of children's discharges. The exception, symptoms and ill-defined conditions, was the only category in which the discharge rates of both age groups were higher in Canada. Diseases of the circulatory system was the only disease category in which the discharge rates of both age groups were higher in the United States.

Diseases of the circulatory system, along with diseases of the digestive system, and complications of pregnancy, childbirth, and the puerperium accounted for approximately 40 percent of the discharges of patients 15 years of age and over in both the United States and Canada. The U.S. discharge rate was 37 percent higher for diseases of the circulatory system and 21 percent higher for diseases of the digestive system. However, Canada had a 10-percent higher discharge rate for complications of pregnancy, childbirth and the puerperium.

Average length of stay

Canadian patients stayed in the hospital longer than U.S. patients in the majority of the diagnostic categories, whether they were under 15 years of age or 15 years of age and over (table C). Canada had longer average lengths of stay in 13 of the diagnostic categories for patients under 15 years of age and in 15 of the categories for patients 15 years of age and over. The average length of stay for U.S. patients was longer in only one category, diseases of the circulatory system, and even in that category, only U.S. children under 15 years of age had longer average lengths of stay. U.S.-Canadian differences in the average lengths of stay of children under 15 years of age were not statistically significant in the categories accidents, poisonings, and violence; diseases of the digestive system; and diseases of the blood and blood-forming organs. For patients 15 years of age and over, the difference in the average length of stay for congenital anomalies was not significant, and the certain conditions of perinatal morbidity and mortality category did not apply.

Two of the categories in which the average lengths of stay for U.S. and Canadian children under 15 years of age did not differ were major discharge categories for children: accidents, poisonings, and violence, and diseases of the digestive system. Among the other important discharge categories, Canada's average length of stay for children under 15 years of age was 19 percent higher for diseases of the respiratory system, 49 percent higher for infective and parasitic diseases, 45 percent higher for diseases of the nervous system and sense organs, and 26 percent higher for symptoms and ill-defined conditions. The

Table D. Discharge rates for patients under 15 years of age discharged from short-stay hospitals, by age and selected diagnostic conditions: United States and Canada, 1978

[For the United States, data are for first-listed diagnosis in non-Federal hospitals. For Canada, data are for principal or primary diagnosis in all short-stay hospitals. Data from both countries exclude newborn infants and are coded using the *Eighth Revision International Classification of Diseases, Adapted for Use in the United States* (ICDA–8)]

Diagnostic category and ICDA–8 code	Under 15 years		Under 1 year		1–4 years		5–14 years	
	United States	Canada	United States	Canada	United States	Canada	United States	Canada
	Rate per 10,000 population							
All conditions[1] 000–999	666	953	2,051	3,066	838	1,340	480	627
Infective and parasitic diseases 000–136	57	94	308	599	76	146	28	30
Diarrheal diseases 009	26	57	138	421	39	93	12	12
Diseases of the nervous system and sense organs 320–389	59	67	119	160	97	104	40	46
Otitis media without mention of mastoiditis 381	30	33	59	99	56	57	18	19
Diseases of the respiratory system 460–519	210	359	619	1,124	326	617	133	199
Upper respiratory infections, except influenza 460–465	30	78	123	382	62	164	10	20
Acute bronchitis and bronchiolitis 466	20	32	160	257	34	51	3	5
Pneumonia, all forms 480–486	47	49	209	241	90	96	18	16
Bronchitis, chronic and unqualified 490, 491	13	27	55	145	25	54	5	7
Asthma 493	12	30	*17	28	22	58	8	20
Hypertrophy of tonsils and adenoids 500	73	122	*	5	74	163	79	118
Diseases of the digestive system 520–577	68	73	260	213	70	74	50	60
Appendicitis 540–543	15	19	*	1	*	3	21	27
Inguinal hernia 550, 552	17	16	90	79	24	24	8	8
Gastroenteritis and colitis, except ulcerative, of noninfectious origin 561	10	4	79	34	14	7	3	1
Congenital anomalies 740–759	30	44	166	216	41	51	14	26
Accidents, poisonings, and violence 800–999	95	115	114	110	98	131	92	110
Intracranial injuries, excluding those with skull fracture 850–854	20	24	*19	25	21	24	19	24

[1] Includes diagnostic conditions not shown in table.

average lengths of stay for patients 15 years and over were 42 percent higher in Canada for diseases of the circulatory system; 18 percent higher for diseases of the digestive system; and 43 percent higher for pregnancy, childbirth, and the puerperium.

Respiratory diseases

Discharge rates in the United States and Canada for the age groups under 15 years of age are presented in table D by selected diagnostic categories. It can be seen that diseases of the respiratory system, the category with the highest discharge rate for children under 15 years of age as a whole, was also the category with the highest discharge rates for children in each of the three age groups, under 1 year, 1–4 years, and 5–14 years, in both countries. Three conditions accounted for the majority of respiratory disease discharges: upper respiratory infections, exept influenza; pneumonia, all forms; hypertrophy of tonsils and adenoids made up 71 percent of the respiratory disease discharges for the under 15 years age group in the United States, and 69 percent in Canada. The importance of the three conditions varied by age.

For the under 1 year age group (figure 3), upper respiratory infections and pneumonia together were responsible for slightly over half of all discharges for diseases of the respiratory system in Canada and the United States. Hypertrophy of tonsils and adenoids was not a major discharge category, but acute bronchitis and bronchiolitis was important, accounting for approximately one-fourth of the respiratory disease discharges for the under 1 year age group in both countries.

For children 1–4 years of age (figure 4), upper respiratory infections, pneumonia, and hypertrophy of tonsils and adenoids together accounted for 69 percent of the respiratory disease discharges in both the United States and Canada. However, for children 5–14 years of age (figure 5), hypertrophy of tonsils and adenoids alone accounted for 59 percent of respiratory disease discharges in both countries. Upper respiratory infections and pneumonia were responsible for 22 percent of the respiratory disease discharges for the 5–14 years age group in the United States and 18 percent in Canada.

The differences in the U.S. and Canadian discharge rates for the three respiratory conditions also varied by age. For the under 15 years age group as a whole, the Canadian discharge rate in the upper respiratory infections category was more than 2½ times the U.S. rate, the differences ranging from 3 times higher Canadian rates for the under 1 year age group to 2 times higher Canadian rates for the 5–14 years age group. The discharge rate for hypertrophy of tonsils and adenoids was 67 percent higher in Canada for all children under 15 years, over

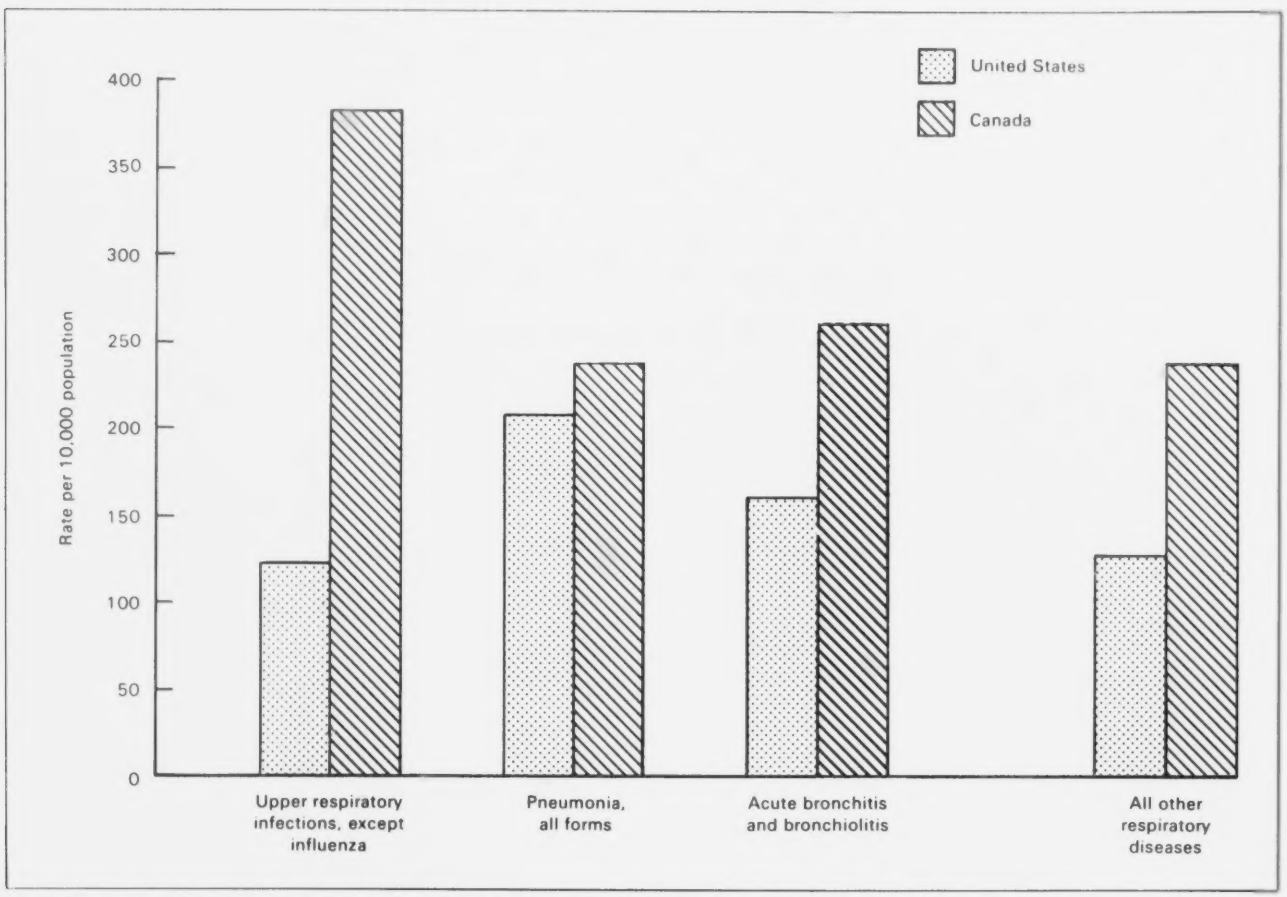

Figure 3. Rates per 10,000 population for patients under 1 year, excluding newborn infants, discharged from short-stay hospitals, by diseases of the respiratory system: United States and Canada, 1978

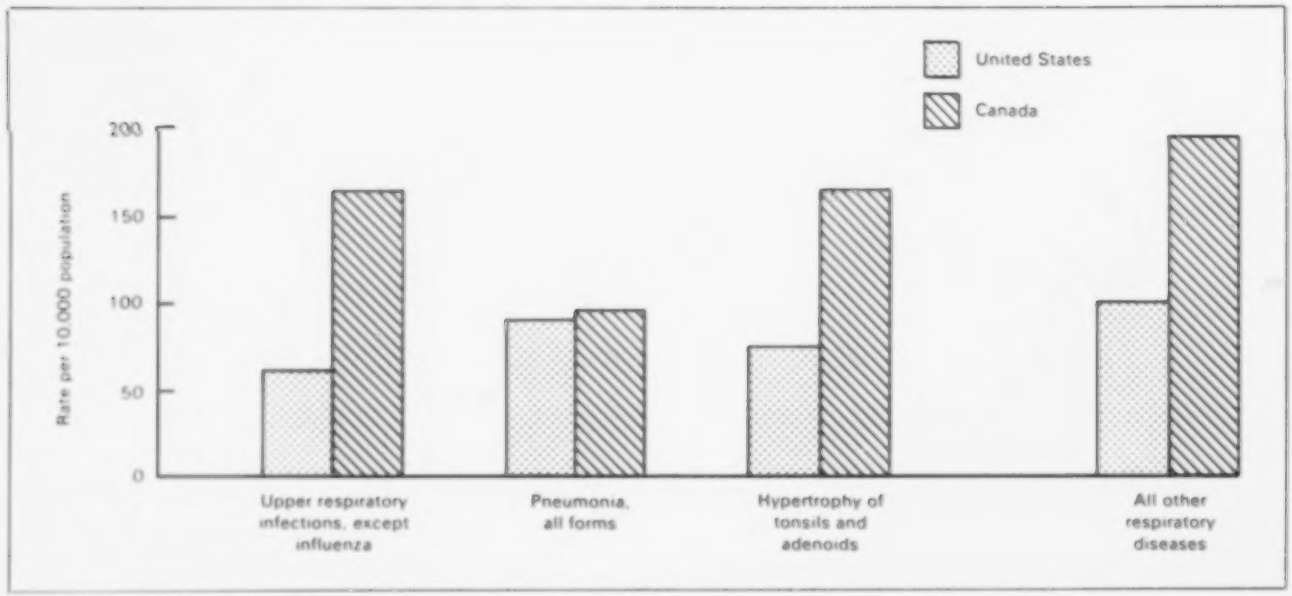

Figure 4. Rates per 10,000 population for patients 1–4 years discharged from short-stay hospitals, by diseases of the respiratory system: United States and Canada, 1978

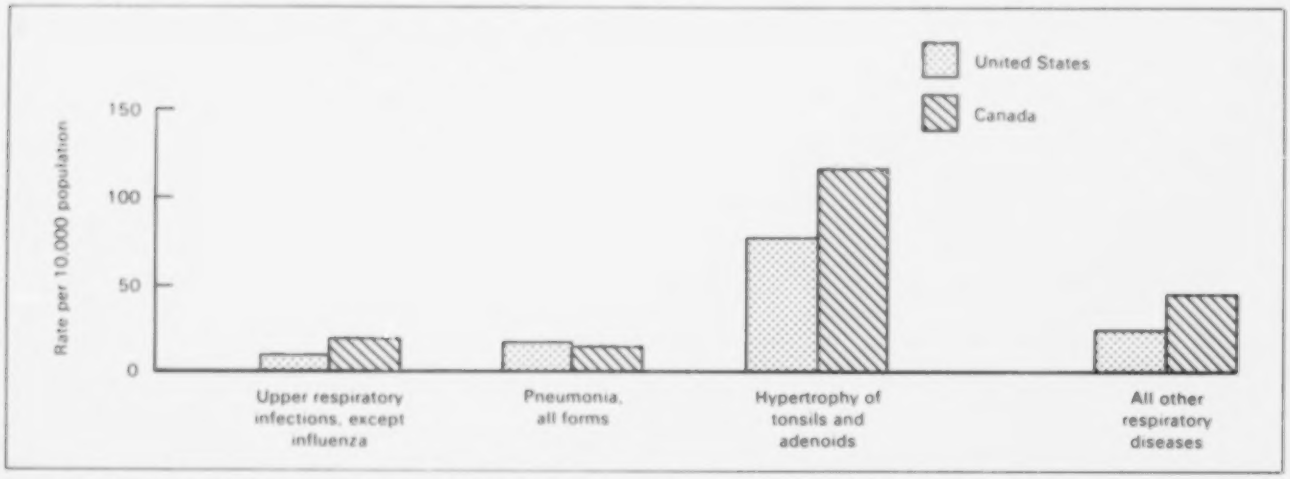

Figure 5. Rates per 10,000 population for patients 5–14 years discharged from short-stay hospitals, by diseases of the respiratory system: United States and Canada, 1978

twice as high for children 1–4 years, and 50 percent higher for those 5–14 years of age. However, the U.S. and Canadian discharge rates for pneumonia were not significantly different for all children under 15 years of age or for any of the three age groups.

Other diagnosis

Among diseases of the digestive system, appendicitis accounted for few discharges of children under 1 or 1–4 years of age, but over 40 percent of the digestive disease discharges of those 5–14 years of age in both Canada and the United States. The Canadian discharge rate for children 5–14 years of age with appendicitis was 29 percent higher than the U.S. rate. In both countries, inguinal hernia was responsible for about one-third of the digestive disease discharges of children under 1 year of age and 1–4 years of age, but for those 5–14 years of age it accounted for only 16 percent of digestive disease discharges in the United States and 13 percent in Canada. The U.S. and Canadian discharge rates for inguinal hernia did not differ significantly for any of the three age groups. Gastroenteritis and colitis, except ulcerative, of noninfectious origin declined in importance with age from the group under 1 year of age, for which it accounted for 30 percent of digestive disease discharges in the United States and 16 percent in Canada, to the group 5–14 years of age for which it made up only 6 percent of digestive disease discharges in the United States and 2 percent in Canada. Gastroenteritis was the one condition for which the U.S. discharge rates were significantly higher than the Canadian rates in each of the three age groups.

In the infective and parasitic diseases category, the discharge rates for Canadian children under 1 year and 1–4 years of age were almost twice the U.S. rates, but there was no significant difference between the countries in the discharge rates for those 5–14 years of age. A similar pattern existed for the subcategory diarrheal diseases. The Canadian discharge rate for the under 1 year age group was 3 times higher, and for the 1–4 years age group the Canadian rate was almost 2½ times higher, but there was no difference in the U.S. and Canadian rates for children 5–14 years of age.

For the diseases of the nervous system and sense organs category and its major subcategory, otitis media, without mention of mastoiditis, the only significant differences between U.S. and Canadian discharge rates were higher Canadian rates for children under 1 year of age. In contrast, discharge rates for the accidents, poisonings, and violence category were not significantly different between the two countries for children under 1 year of age, but Canadian rates were higher for those 1–4 years and 5–14 years of age. Discharge rates for intracranial injuries, excluding those with skull fracture, were significantly different only for the 5–14 years age group, whose rate was higher in Canada. Discharge rates for congenital anomalies, though, were consistently higher in Canada, 30 percent higher for children under 1 year, 24 percent higher for children 1–4 years, and 86 percent higher for children 5–14 years of age.

Surgical procedures

The U.S. and Canadian rates of discharged patients with a surgical procedure are shown for the groups under 15 years and 15 years and over by the 17 ICDA-8 procedure categories. The surgical rates for the United States in tables E and F are somewhat lower than the 1978 surgical rates provided in earlier reports from the U.S. National Hospital Discharge Survey. The previous reports usually refer to all-listed procedures, which may include up to three procedures per discharge. Because only primary surgical procedure data are available for Canada, the U.S. rates in this report are only for the procedures listed first on the face sheet of the discharged patients' medical records.

The total rate of surgical discharges for children under 15 years of age was 21 percent higher in Canada than in the United States, but for persons 15 years of age and over, the difference in total surgical discharge rates between the two countries was not statistically significant. Contrary to the numerous U.S.-Canadian differences in discharge rates for disease categories, surgical rates did not differ significantly in the majority of procedure categories for either the groups under 15 years of age or 15 years of age and over.

Children under 15 years of age had low surgical rates in most of the procedure categories. The otorhinolaryngology category had the highest rate in both countries, accounting for 38 percent of the surgical discharges of the under 15 years age group in the United States and 44 percent in Canada. The rate of otorhinolaryngology procedures was 39 percent higher in Canada. Other categories that had relatively large rates of surgical discharges for children under 15 years of age in both countries included orthopedic surgery, for which the Canadian rate was 23 percent higher, and abdominal and urological surgery, for which the rates in Canada and the United States did not differ significantly.

Canada's surgical rate remained higher than the U.S. rate in the otorhinolaryngology category for persons 15 years of age and over, although the category was much less important, accounting for only 5 percent of surgical discharges for the older age group in

Table E. Rates of surgical procedures for patients discharged from short-stay hospitals, by age and surgical category: United States and Canada, 1978

[For the United States, data are for first-listed surgical procedures in non-Federal hospitals. For Canada, data are for primary surgical procedures in all short-stay hospitals. Data from both countries exclude newborn infants and are coded using the *Eighth Revision International Classification of Diseases, Adapted for Use in the United States* (ICDA–8)]

Surgical category and ICDA–8 code		Under 15 years		15 years and over	
		United States	Canada	United States	Canada
		Rate per 10,000 population			
Total surgical procedures	01–99, A1–A2	280	338	785	718
Neurosurgery	01–05	4	5	16	13
Ophthalmology	06–14	14	17	34	28
Otorhinolaryngology	16–21	107	149	39	46
Operations on thyroid, parathyroid, thymus, and adrenals	22–23	*1	1	5	3
Vascular and cardiac surgery	24–30	9	7	49	37
Thoracic surgery	32–35	2	1	12	7
Abdominal surgery	38–48	42	44	106	108
Proctological surgery	50–52	*2	2	21	24
Urological surgery	54–61	25	27	57	48
Breast surgery	65	*	(1)	16	13
Gynecological surgery	67–72	3	2	133	131
Obstetrical procedures	74–78	*2	(1)	81	79
Orthopedic surgery	80–90	39	48	115	107
Plastic surgery	92–94	18	20	37	29
Oral and maxillofacial surgery	95–98	3	3	7	7
Dental surgery	99	4	8	15	13
Biopsy	A1–A2	5	3	43	22

[1]Quantity more than zero but less than 0.5.

Table F. Rates of surgical procedures for patients discharged from short-stay hospitals, by age and selected surgical categories: United States and Canada, 1978

[For the United States, data are for first-listed surgical procedures in non-Federal hospitals. For Canada, data are for primary surgical procedures in all short-stay hospitals. Data from both countries exclude newborn infants and are coded using the *Eighth Revision International Classification of Diseases, Adapted for Use in the United States* (ICDA–8)]

Surgical category and ICDA–8 code	Under 15 years		Under 1 year		1–4 years		5–14 years	
	United States	Canada	United States	Canada	United States	Canada	United States	Canada
	Rate per 10,000 population							
Total surgical procedures[1]	280	338	429	365	294	384	262	319
Otorhinolaryngology 16–21	107	149	*30	20	127	193	107	145
Myringotomy 17.0	15	12	*	11	27	18	11	10
Tonsillectomy with or without adenoidectomy 21.1, 21.2	67	109	*	2	63	143	73	107
Abdominal surgery 38–48	42	44	138	131	34	35	36	40
Repair of inguinal hernia 38.2, 38.3	17	16	86	74	23	23	8	8
Appendectomy 41.1	15	20	*	1	*	3	21	27
Urological surgery 54–61	25	27	48	46	33	39	19	20
Circumcision 61.2	6	8	*23	29	8	15	3	4
Orthopedic surgery 80–90	39	48	39	43	19	30	46	55

[1] Includes surgical procedures not shown in table.

the United States and 6 percent in Canada. Three surgical procedure categories, abdominal, gynecological, and orthopedic surgery were responsible for 45 percent of the surgical discharges for patients 15 years and over in the United States and 48 percent in Canada. In none of these categories were the differences in surgical discharge rates between the United States and Canada statistically significant.

U.S. and Canadian rates for discharges with selected surgical procedures for children under 15 years of age are shown in table F. The rate for total surgical discharges in the 1–4 years age group was 31 percent higher in Canada than in the United States, and the total Canadian rate for children 5–14 years of age was 22 percent higher. The total surgical discharge rates for the under 1 year age group were not significantly different. In fact, for none of the procedure categories listed in table F were the surgical discharge rates of children under 1 year significantly different between the two countries.

Tonsillectomy

The surgical procedure category of central importance for children under 15 years of age was tonsillectomy with or without adenoidectomy. Although not often performed on children under 1 year, the procedure accounted for over one-third of all surgical discharges for children 1–4 years and 5–14 years of age in Canada, and in the United States, 21 percent for those 1–4 years of age and 28 percent for those 5–14 years of age. The rate of discharges for the procedure was more than twice as high in Canada as in the United States for children 1–4 years of age and 47 percent higher for children 5–14 years of age.

In a further age breakdown not shown in table F, it was found that the rate of discharges for the procedure for children 5–9 years of age was 172 in Canada compared with 104 in the United States, a 65-percent difference. For children 10–14 years of age, though, the Canadian rate, at 50, was not significantly different from the U.S. rate of 46. It was also discovered that if tonsillectomy with or without adenoidectomy was excluded, no significant differences remained in U.S. and Canadian rates for all other surgical discharges combined for any of the children's age groups.

Because of the central importance of tonsillectomy, trends in the use of the procedure were investigated. The incidence of tonsillectomy is known to have peaked in the 1930's.[40] However, the first national data on surgery from hospital discharge records did not become available until 1965 in United States and 1966 in Canada.

A graph of tonsillectomy rates for children under 15 years of age from 1965 to 1980 in the United States and from 1966 to 1980 in Canada is presented in figure 6. The graph shows a steady decrease in rates for both countries. In fact, the rates in the United States and Canada decreased at the same rate, 66 percent from 1966 to 1980. The Canadian rate was 59 percent higher than the U.S. rate both in 1966 and in 1980. In spite of the sizable decrease in rates, tonsillectomy remains the most frequently performed surgical procedure on children under 15 years in both countries.

Other procedures

As is shown in table F, there were differences in other specific surgical procedure categories. The only surgical procedure category for which the U.S. rate was significantly higher than the Canadian rate was myringotomy, and the U.S. rate was only higher for children 1–4 years of age. Canadian children in the age group 1–4 years had significantly higher rates for circumcision and orthopedic surgery. Besides otorhinolaryngology, the only procedure for which discharge rates of children 5–14 years of age differed significantly was appendectomy, Canadian children having a 29-percent higher rate.

Newborn infants

Health status

For this report, a newborn infant was a baby born in the hospital during 1978. The babies who remained continuously

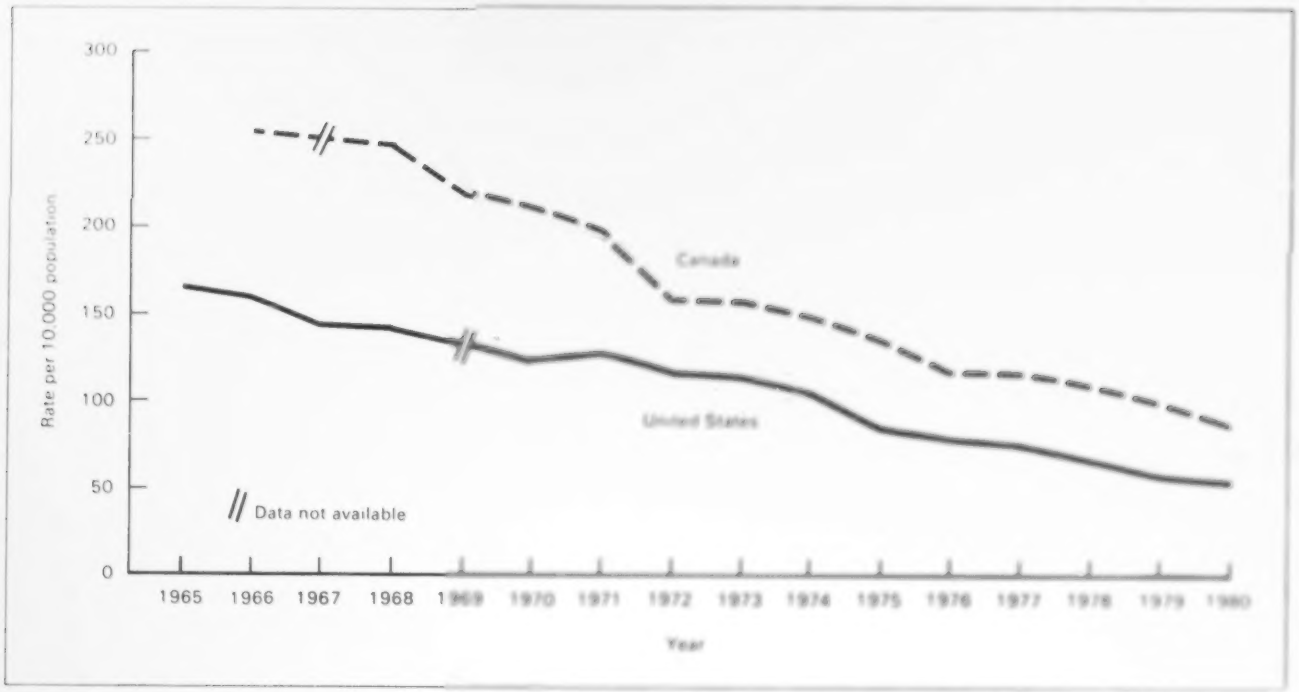

Figure 6. Rates per 10,000 population for patients under 15 years, excluding newborn infants, discharged with tonsillectomy with or without adenoidectomy: United States, 1965–80; Canada, 1966–80

in the hospital where they were born were considered newborn infants, regardless of how long they were hospitalized. However, an infant admitted or transferred to another hospital at any time after birth was considered a patient under 1 year of age in the hospital to which admitted or transferred. There was one exception to this definition in Canada. A baby admitted to a Canadian hospital after birth with its mother for maternal care was counted as a newborn infant.

Generally, data on newborn infants are not included in hospital utilization rates, but the data can be examined separately. The percent distribution and average length of stay of newborn infants in the United States and Canada are shown in table G by health status. In this table newborn infants are classified as healthy, immature, or sick. A healthy newborn infant is one whose only diagnosis was that of single or multiple birth, without mention of immaturity. If immaturity was mentioned, but no specific disease was reported, the infant is considered immature. Sick newborn infants have a diagnosis of a specific disease, other than or in addition to immaturity and single or multiple birth. Thus, some immature newborn infants were included in the sick category rather than the immature category.

The proportion of newborn infants who were not healthy was 16 percent higher in the United States than in Canada. The United States had a much higher proportion of immature infants. However, there was no significant difference between the two countries for the sick newborn infant category.

While the average length of stay for all newborn infants was longer in Canada, the difference was accounted for by the healthy newborn infants, whose hospital stay was almost twice as long in Canada. For the immature newborn infant category, the average length of stay was longer in the United States, and for the category of sick newborn infants, the difference in U.S. and Canadian average lengths of stay was not statistically significant.

Table G. Percent distribution and average length of stay of newborn infants, by health status: United States, 1978; Canada, 1977

[For the United States, data are for short-stay, non-Federal hospitals. For Canada, data are for general and allied special hospitals]

Health status	United States	Canada	United States	Canada
	Percent distribution of newborn infants		Average length of stay in days	
All newborn infants	100.0	100.0	4.3	5.8
Healthy infants	75.0	78.5	2.6	5.1
Immature infants[1]	5.4	2.9	15.3	11.5
Sick infants	19.6	18.6	7.7	7.6

[1] Those with an additional diagnosis are included in the sick newborn category.

Sick newborn diagnoses

Discharge rates and average lengths of stay for newborn infants are presented by diagnostic categories in table H. Because only the infants in the sick category had a diagnosis of a specific disease, only they are included in the table. Two of the categories, maternal conditions and conditions of the placenta and umbilical cord, were not used in the U.S. National Hospital Discharge Survey for coding the diagnoses of newborn infants. These categories accounted for 8 percent of the sick newborn infant discharges in Canada.

Table H. Discharge rates and average lengths of stay for sick newborn infants, by diagnosis: United States, 1978; Canada, 1977

(For the United States, data are for second-listed diagnosis[1] in short-stay non-Federal hospitals. For Canada, data are for principal or primary diagnosis in general and allied special hospitals. Data from both countries are coded using the *Eighth Revision International Classification of Diseases, Adapted for Use in the United States* (ICDA–8).)

Diagnostic category and ICDA–8 code		*United States*	*Canada*	*United States*	*Canada*
		Rate per 10,000 newborn infants		Average length of stay in days	
Total sick newborns		1,957	1,860	7.7	7.6
Congenital anomalies	740–759	254	227	6.6	8.3
Maternal conditions	760–769	---	72	---	7.1
Conditions of placenta and umbilical cord	770–771	---	83	---	5.5
Birth injury	772	89	79	4.0	6.2
Hemolytic disease of newborn	774–775	153	97	5.3	7.4
Anoxic and hypoxic conditions not elsewhere classified	776	328	293	15.5	9.3
Other conditions of newborn	777–778	800	769	5.4	6.8
Conditions other than congenital anomalies and certain causes of perinatal morbidity	000–738, 760–999	333	239	8.5	6.9

[1] First-listed diagnoses indicate maturity or immaturity and single or multiple birth.

The largest diagnostic category was other conditions of newborn, which accounted for 41 percent of sick newborn discharges in both the United States and Canada. Three other categories also had large rates. Anoxic and hypoxic conditions made up 17 percent of the discharges for the United States and 16 percent for Canada, the residual category composed 17 percent for the United States and 13 percent for Canada, and the congenital anomalies percent was 13 for the United States and 12 for Canada. Together these three categories accounted for 47 percent of U.S. and 41 percent of Canadian discharges.

The United States had higher rates for two categories. For hemolytic disease of the newborn, the U.S. rate was 58 percent higher; and for the residual category, the U.S. rate was 39 percent higher. No significant differences were found between the two countries in the rates for the other sick newborn categories.

While the total average lengths of stay for sick newborn infants were not significantly different in the United States and Canada, differences did exist between the countries in the average lengths of stay for specific newborn infant diagnostic categories. Canadian newborn infants stayed in the hospital 55 percent longer for birth injuries, 40 percent longer for hemolytic disease, and 26 percent longer for congenital anomalies and other conditions of the fetus or newborns. However, newborn infants in the United States had hospital stays 67 percent longer for anoxic and hypoxic conditions. The difference between the United States and Canada in length of stay for the residual category was not statistically significant.

Reporting practices

The contrast between the higher rate of discharges for sick newborn infants in the United States and the higher discharge rate for other children under 1 year of age in Canada raises questions about whether, although the definitions of the two groups are similar in the United States and Canada, reporting practices vary between the countries. It is possible that the data from the National Hospital Discharge Survey are overestimates of the number of sick newborn infants in the United States. The 1978 estimate of the total number of newborn infants from the survey was 3.68 million while the 1978 estimate of the total number of live births in the United States was only 3.33 million.[41] Although the difference in the estimates is not statistically significant, it has been a cause for investigation. Problems were also encountered in the U.S. survey with classification of babies transferred from one hospital to another on the day of birth. Although after a transfer a baby should have been classified as a patient under 1 year of age, because of insufficient documentation on the face sheet of the medical record, some may have been counted as newborn infants.

However, even if variation in reporting practices results in an exaggeration of the difference in the rates of sick newborns between the United States and Canada, examination of other data suggests that there is likely to be a higher proportion of sick newborn infants in the United States. Infant mortality data are discussed in the next section of the report. The percent of live births by birthweight categories is shown in table J for the two countries. Low birthweight is associated with health problems and probably with longer hospitalizations. The United States has a 50-percent higher proportion of live births in the extremely low birthweight category of 1,500 grams or less. The percent of births in the other low birthweight category, 1,501–2,500 grams, was also higher in the United States. Canada had a higher percent of births with normal birthweights, 2,501–4,500 grams, but the United States had a higher percent of births with very large birthweights, 4,501 grams or more.

Table J. Percent distribution of live births by birthweight categories: United States and Canada, 1978

Birthweight	*United States*	*Canada*[1]
	Percent distribution	
Total	100.0	100.0
1,500 grams or less	1.2	0.8
1,501–2,500 grams	5.9	5.4
2,501–4,500 grams	91.1	92.2
4,501 grams or more	1.8	1.5

[1] Excludes Newfoundland, which accounted for 3 percent of Canadian live births.

SOURCE: United Nations, *Demographic Yearbook, 1981*. New York, 1983.

Hospital fatalities

The fatality rates for hospital patients in the United States and Canada are presented in table K. For all ages category (excluding newborn infants), the fatality rates in the two countries were not significantly different. The similar rates may suggest that the seriousness of hospital patients' conditions is about the same in both countries.

The difference between the United States and Canada in hospital fatality rates for newborn infants was not statistically significant; however, the U.S. fatality rates were twice as high for other children under 1 year of age and 50 percent higher for children 1–14 years of age. As has already been discussed, U.S. children at these ages were less likely to be in the hospital than Canadian children. If the fatality rates are taken as an indication that hospitalized children were more seriously ill in the United States than in Canada, the conclusion might be either that there was less unnecessary hospital use by children in the United States, or that barriers to health services prevented U.S. children from reaching the hospital until their conditions had deteriorated. These issues are explored further in two later sections—Health Status and Health Services.

The total hospital fatality rates of patients 15 years of age and over in the United States and Canada were not significantly different and neither were the rates of patients 15–44 years of age. In Canada, though, patients 45–64 years of age and 65 years of age and over had higher fatality rates.

Table K. Hospital fatality rates for patients discharged from short-stay hospitals by age: United States and Canada, 1978

(For the United States, data are for non-Federal hospitals; for Canada, data are for all short-stay hospitals)

Age group	United States	Canada
	Rate per 10,000 discharges	
All ages (excluding newborn infants)	247	240
Newborn infants	69	54
Under 15 years	62	36
Under 1 year	180	89
1–14 years	33	22
15 years of age and over	267	278
15–44 years	32	30
45–64 years	238	276
65 years and over	702	828

Discussion

In each of the three age groups of children under 15 years of age, both sex groups, and the diagnostic categories that accounted for the majority of children's discharges, U.S. children had lower discharge rates than Canadian children. The lower discharge rates were accompanied by shorter average lengths of stay for U.S. children across most age, sex, and diagnostic categories so that children's total hospital use was lower in the United States. These widespread differences in children's hospital use suggest that general factors, such as children's health status or health services, vary between the United States and Canada.

However, some specific hospital use differences between the United States and Canada also stood out in the comparison. Most striking was the higher rate of tonsillectomies in Canada. This surgical procedure, which has been a focus of controversy in the United States,[42] accounted for the higher total rates of surgical procedures on children in Canada, and the diagnosis hypertrophy of tonsils and adenoids accounted for a substantial proportion of Canadian children's higher discharge rates for respiratory diseases. Because respiratory diseases were the most important discharge diagnoses of children in both countries, the two and three times higher discharge rates for upper respiratory conditions in Canada also attracted special attention, particularly since no differences were found in discharge rate for pneumonia. These and other specific differences indicate that in addition to variations in general factors, differences may exist in the incidence of certain conditions or medical practices.

The lower discharge rates of U.S. children were in marked contrast to the higher rates across most diagnostic categories of persons 15 years of age and over in the United States. Factors that might help explain the contrast are explored in the remainder of the report, including health status indicators and characteristics of the health services systems in the United States and Canada.

Health status

A possible explanation of the differences in hospital use patterns in the United States and Canada could be that U.S. children enjoy better health than Canadian children, but that U.S. adults are less healthy than Canadian adults. Mortality and morbidity rates in the two countries were compared to examine this possibility.

Mortality statistics are often used in international research to indicate health status. However, many more people suffer illness and injuries than die in a given time period. In addition, morbidity levels do not necessarily rise and fall with mortality levels. For instance, advances in the treatment of immature infants could reduce their death rates but result in a greater number of children with health problems. On the other hand, measuring morbidity is more difficult than identifying deaths. Morbidity indicators usually rely on self-reports of health status and behavior, which can be influenced by a variety of factors other than actual health, such as variations in sick leave or retirement programs or different expectations about "normal" levels of health.

Morbidity

Three commonly used morbidity indicators, disability days, bed days, and percent of persons with limitation of activity, are presented in table L for the United States and Canada. Disability days refers to the average number of days in a year persons reduce their usual activities because of illness or injury. Disability days include days spent in bed, days in which school or work was missed or housework could not be undertaken, and days when persons had to cut back but not completely abandon usual activities. Bed days are a subset of disability days, referring to the annual average number of days persons spend most or all of their time in bed because of an illness or injury. All days spent in a hospital are counted as bed days. Limitation of activity

Table L. Average annual number of disability and bed days and percent of persons with limitation of activity, by age and sex: United States, 1978; Canada, 1978–79

[Data are based on household surveys of the civilian noninstitutionalized population of the United States and the noninstitutionalized population of the Provinces in Canada. Further information about the surveys is provided in appendix I]

Age group and sex	United States	Canada	United States	Canada	United States	Canada
	Disability days per person per year		Bed days per person per year		Percent of persons with limitation of activities	
All ages						
Total	18.8	15.7	7.1	5.3	14.2	11.6
Male	16.3	12.5	6.0	4.2	14.3	10.9
Female	21.1	18.9	8.2	6.3	14.1	12.2
Under 15 years						
Total	11.1	8.7	5.2	3.6	3.7	2.8
Male	10.7	8.6	4.9	3.5	4.0	3.4
Female	11.6	8.8	5.5	3.7	3.4	2.2
15–64 years						
Total	18.0	15.7	6.6	4.8	13.0	11.2
Male	15.8	11.9	5.3	3.8	13.5	10.6
Female	20.1	19.5	7.9	5.8	12.4	11.9
65 years and over						
Total	40.3	35.0	14.6	13.2	45.0	38.2
Male	35.1	30.2	14.2	10.6	48.2	38.1
Female	43.9	38.8	14.8	15.3	42.7	38.3

refers to an inability to perform all the usual activities of the population group throughout most of a year period because of health conditions. For children, the limitations would be in the amount or kind of school or play activities; for adults, limitations would be in ability to work, do housework, or engage in social and recreational activities.

The U.S. population was reported to have 20 percent more disability days and 34 percent more bed days per person per year than the Canadian population. In addition, the percent of the population with some degree of ongoing limitation of activity was 22 percent higher in the United States than in Canada. In both countries, children under 15 years of age experienced less disruption of their usual activities because of health problems than did adults. The proportions of children with yearlong limitations was especially small, and the difference in the proportion of U.S. and Canadian children with such limitations was not significant. However, U.S. children were reported to have 28 percent more total disability days and 44 percent more bed days than Canadian children.

Interpretation of these morbidity indicators is complicated by a lack of comparability in the U.S. and Canadian surveys from which the indicators were taken. While similar definitions were used in both countries, differences in the survey methodologies were likely to result in higher estimates for the United States than for Canada. For example, in the Canadian survey nonresponse was coded as "unknown," while U.S. data were adjusted for nonresponse by an imputation procedure. Also, U.S. survey respondents had more than one opportunity to report bed and disability days; and, if their answers varied, the higher number was used. Canadian survey respondents were asked about bed and disability days only once. Because of the survey differences, and the other problems in measuring morbidity, the statistics in table L must be viewed with caution.

Mortality

The U.S. death rate was 21 percent higher than the Canadian death rate in 1978. As is shown in table M, higher death rates were found in the United States for each age group except 75 years and over. The largest difference, 26 percent, was in the death rates for persons 25–34 years of age. The U.S. death rate was 10 percent higher for children under 15 years.

In both countries males in every age group had a higher death rate than females. This contrasts with adult hospital discharge rates, which were generally higher for females. The death rates of both males and females were higher in the United States than in Canada for each age group under 75 years. For all ages the U.S. death rate was 18 percent higher for males, 27 percent higher for females. Among children under 15 years the male death rate in the United States was 9 percent higher, and the female death rate 12 percent higher.

A detailed examination of children's death rates in the United States and Canada reveals large variations by age group (table N). The highest death rates, like the highest hospital discharge rates, were for children in their first year of life. The U.S. death rate was 14 percent higher than the Canadian rate for the under 1 year age group, and this excess accounted for

Table M. Death rates by sex and age: United States and Canada, 1978

Age group	Both sexes		Male		Female	
	United States	Canada	United States	Canada	United States	Canada
	Rate per 100,000 population					
All ages	868	715	977	831	764	601
Under 15 years	128	116	145	133	110	98
15–24 years	115	106	169	161	60	51
25–34 years	132	105	187	148	78	62
35–44 years	239	197	312	257	169	135
45–54 years	610	524	802	691	432	357
55–64 years	1,387	1,257	1,884	1,729	948	823
65–74 years	3,016	2,886	4,182	3,934	2,125	1,997
75 years and over	8,642	8,808	10,624	10,780	7,530	7,542

Table N. Death rates for children under 15 years by sex and age: United States and Canada, 1978

Age group	Both sexes		Male		Female	
	United States	Canada	United States	Canada	United States	Canada
	Rate per 100,000 population					
Under 15 years	128	116	145	133	110	98
Under 1 year	1,381	1,215	1,533	1,352	1,223	1,070
1–4 years	68	63	77	71	59	55
5–9 years	33	38	38	45	27	30
10–14 years	34	36	43	46	24	24

the overall higher death rate of U.S. children under 15 years of age.

In the other three age groups, the differences between U.S. and Canadian death rates varied, unlike the hospital discharge rates for these age groups, which were significantly higher in Canada. The United States had an 8-percent higher death rate for children 1–4 years of age, but Canada had a 15-percent higher rate for those 5–9 years and a 6-percent higher rate for those 10–14 years of age. The higher death rates of Canadian children 5 years of age and over indicate that lower health status may help explain the higher hospital use of these age groups.

In both countries, male death rates were higher than female death rates for all the age groups under 15 years of age, which was consistent with sex patterns in children's hospital use. For children under 1 and 1–4 years, the death rates of both males and females were higher in the United States. For males and females 5–9 years and males 10–14 years of age death rates were higher in Canada. Females 10–14 years of age had identical death rates in the two countries.

Infant mortality rates are presented by age in table O. The first 27 days of life were the most hazardous, accounting for two-thirds of all first-year deaths in both countries. Mortality rates for infants under 28 days of age were higher in the United States than in Canada. The U.S. rates were 16 percent higher for infants under 24 hours old, 20 percent higher for those 1 to 7 days old, and 19 percent higher for those 7 to 28 days old. These differences agree with the lower proportion of healthy newborn infants discharged from U.S. hospitals. However, the infant mortality rates do not suggest that a lower health level explains the higher Canadian discharge rate of infants under 1 year of age not classified as newborns. The differences in mortality rates diminished for older infants, but the United States continued to have higher rates for infants at each stage of the first year of life.

Table O. Infant mortality rates by age: United States and Canada, 1978

Age group	*United States*	*Canada*
	Rate per 100,000 live births	
Under 1 year of age	1,378	1,195
Under 24 hours	511	439
1 to 7 days	287	240
7 to 28 days	150	126
28 days to 6 months	335	300
6 months to 1 year	95	90

Cause of death

Comparison of death rates by cause may help to explain differences in hospital use for specific diagnoses. A higher death rate in one of the countries for a condition may suggest that the condition is a greater health problem for the country's population. A higher discharge rate for the condition could then be a reflection of the greater health problem.

Children under 15 years

Death rates for the 17 main categories of diseases are presented in table P for U.S. and Canadian children under 15 years of age. In figures 7 and 8 the death rates and discharge rates of children under 15 years for selected disease categories are compared. Four categories accounted for over three-fourths of all children's deaths in both countries: congenital

Table P. Death rates by age and cause of death category: United States and Canada, 1978

[Causes of death are coded according to the *Eighth Revision of the International Classification of Diseases, Adapted for Use in the United States* (ICDA–8)]

Cause of death category and ICDA–8 code	*Under 15 years*		*15 years and over*	
	United States	*Canada*	*United States*	*Canada*
	Rate per 100,000 population			
All causes 000–999	128	116	1,094	906
Infective and parasitic diseases 000–136	6	4	9	4
Neoplasms 140–239	5	5	235	209
Endocrine, nutritional, and metabolic diseases 240–279	1	2	25	20
Diseases of the blood and blood-forming organs 280–289	1	1	3	3
Mental disorders 290–315	(1)	(1)	6	7
Diseases of the nervous system and sense organs 320–389	5	4	9	9
Diseases of the circulatory system 390–458	4	1	576	451
Diseases of the respiratory system 460–519	6	6	70	60
Diseases of the digestive system 520–577	2	2	39	35
Diseases of the genitourinary system 580–629	1	(1)	15	11
Complications of pregnancy, childbirth, and the puerperium 630–678	(1)	-	(1)	(1)
Diseases of the skin and subcutaneous tissue 680–709	(1)	(1)	1	1
Diseases of the musculoskeletal system and connective tissue 710–738	(1)	(1)	3	3
Congenital anomalies 740–759	19	24	2	1
Certain causes of perinatal mortality 760–769.2, 769.4–772, 774–778	42	32	(1)	-
Symptoms and ill-defined conditions 780–796	12	10	15	10
Accidents, poisonings, and violence 800–999	24	25	85	82

[1] Quantity more than zero but less than 0.5.

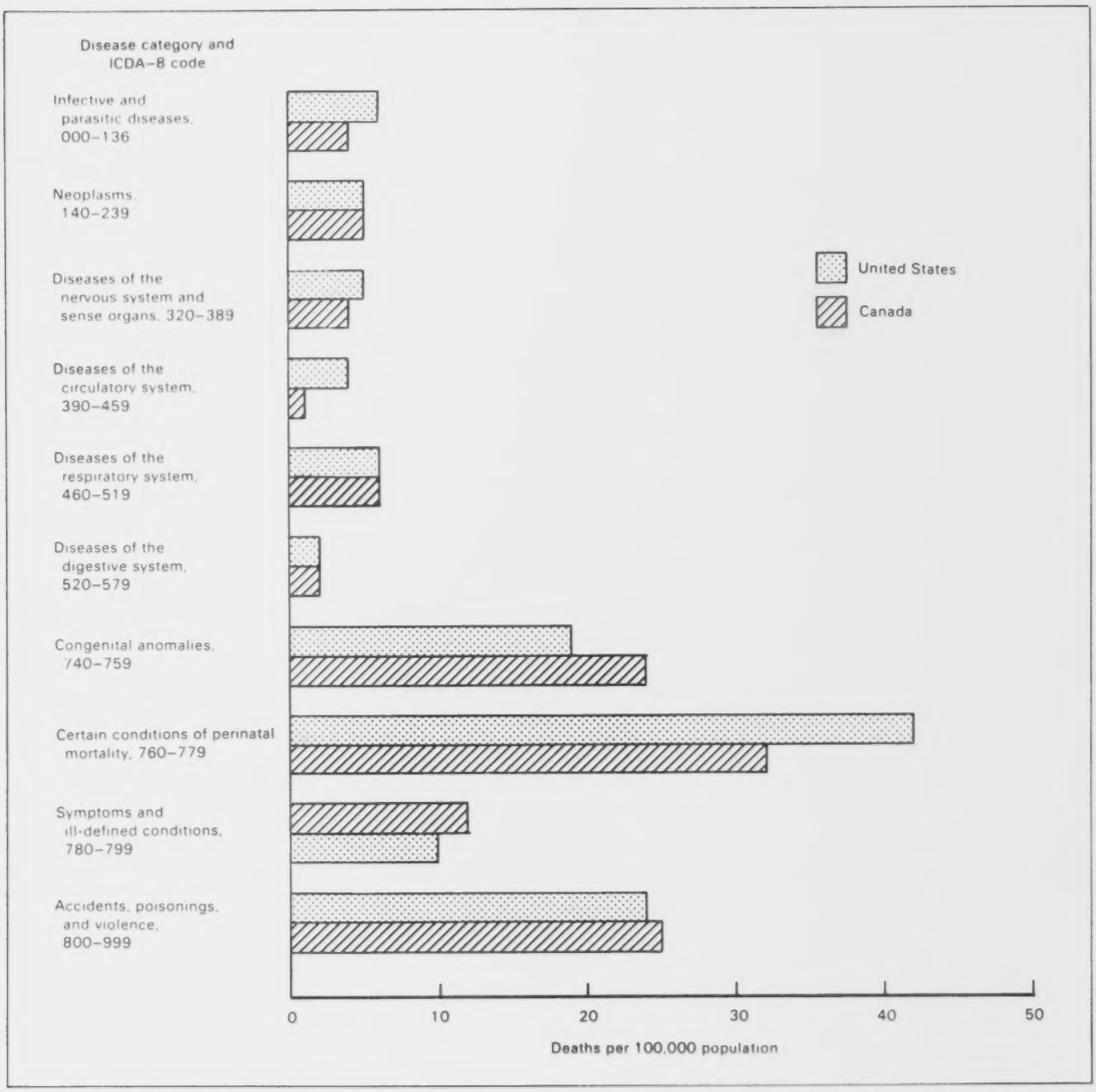

Figure 7. Deaths per 100,000 population for persons under 15 years of age, by selected causes of death: United States and Canada, 1978

anomalies; certain causes of perinatal mortality; symptoms and ill-defined conditions; and accidents, poisonings, and violence. Canadian children had higher discharge and death rates for congenital anomalies, and accidents, poisonings, and violence, but the difference in the rates were considerably greater for discharges, a 26-percent higher death rate but 47-percent higher discharge rate for congenital anomalies and only a 4-percent higher death rate but a 21-percent higher discharge rate for accidents, poisonings, and violence. U.S. children had higher death and discharge rates for certain causes of perinatal mortality. However, in the symptoms and ill-defined conditions category, U.S. children had a higher death rate although the discharge rate was higher for Canadian children.

The most important discharge category, diseases of the respiratory system, accounted for only about 5 percent of the deaths for children under 15 years of age in both countries. Further, children's death rates for respiratory diseases were identical in the two countries, which contrasted sharply with the significantly higher discharge rate for this category in Canada.

Discharge and death rates were also incongruent for two of the other important discharge categories, infective and parasitic

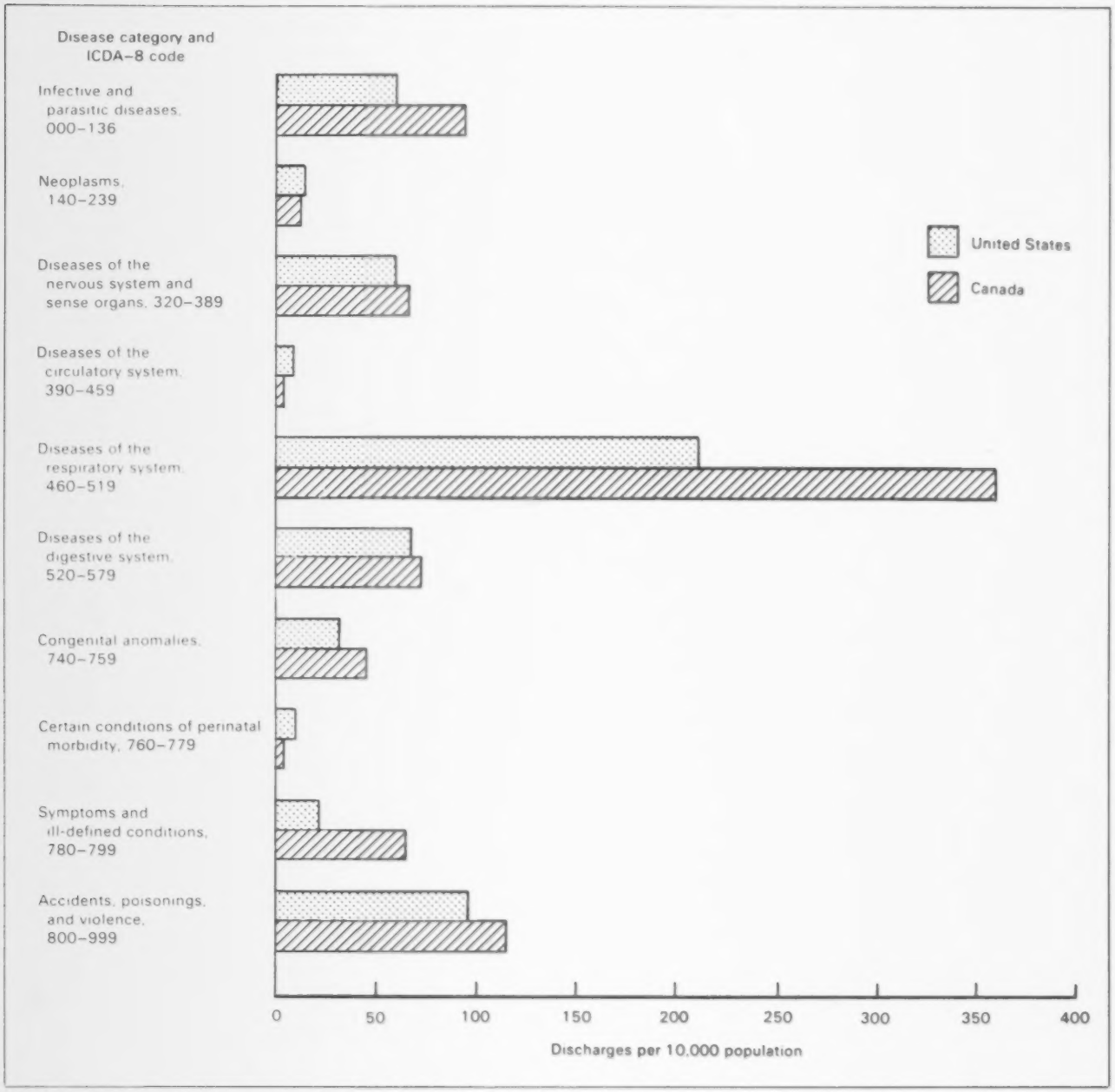

Figure 8. Rates per 10,000 population for patients under 15 years, excluding newborn infants, discharged from short-stay hospitals, by diagnostic categories: United States and Canada, 1978

diseases, and diseases of the nervous system and sense organs. The death rates for children under 15 years of age were small for both categories, and the U.S. death rates were slightly higher, though Canada had significantly higher discharge rates for both categories. Diseases of the digestive system was another relatively important discharge category for persons under 15 years of age; but this category accounted for few deaths in either country. Death rates for the category were identical in both countries, which was consistent with the lack of significant difference in discharge rates.

Though not a major discharge or death category, it is interesting to note the differences between the United States and Canada in diseases of the circulatory system. The children's death rate for circulatory diseases was four times higher, and the discharge rate two times higher, in the United States than in Canada. On the other hand, children's death rates for neoplasms were identical in the two countries, and children's discharge rates for the category were not significantly different.

15 years and over age group

Table P also contains death rates by disease category for the 15 years and over age group. Four categories accounted for

approximately 90 percent of all deaths in both Canada and the United States. The categories were diseases of the circulatory system; neoplasms; accidents, poisonings, and violence; and diseases of the respiratory system. The death rates and the discharge rates for the four categories were higher in the United States than in Canada; but for accidents, poisonings, and violence, the difference in death rates was small. Small differences in death rates were also the rule in most of the other 13 disease categories, although the U.S. death rates were usually slightly higher. The Canadian death rate was slightly higher in one category, mental diseases, but it was a category for which the U.S. discharge rate was higher.

Infant mortality

Infant mortality rates (deaths in the first year of life divided by live births) are shown for conditions that were leading causes of infant deaths in table Q. In both the United States and Canada, three categories accounted for over three-fourths of all infant deaths: congenital anomalies, certain causes of perinatal mortality, and symptoms and ill-defined conditions.

For congenital anomalies, Canadian infants had a 31-percent higher mortality rate than U.S. infants, which was similar to the higher discharge rate for Canadian children under 1 year in the category. The higher infant mortality rates held for all but two of the specific types of anomalies. Particularly striking was the Canadian rate for spina bifida, which was over 3½ times the U.S. rate. Congenital anomalies affecting multiple systems, which include Down's Syndrome, and congenital anomalies of the circulatory system other than heart anomalies were the only anomalies for which the U.S. infant mortality rates were higher.

U.S. infants had higher mortality rates in the certain causes of perinatal mortality category. Infants under 1 year of age in the United States also had a higher discharge rate for the corresponding category, certain causes of perinatal morbidity. Within the category, the U.S. infant mortality rates were higher for each specific condition, except conditions of the placenta.

For the symptoms and ill-defined conditions category, U.S. infants had a higher mortality rate. However, Canadian infants under 1 year of age had a higher discharge rate.

Among the other causes of infant deaths, pneumonia and accidents were the most important in both countries. Pneumonia accounted for more than two-thirds of all infant deaths from respiratory diseases in both countries, and accidents accounted for approximately 85 percent of infant deaths in the accidents, poisonings, and violence category. The U.S. and Canadian infant mortality rates for pneumonia were almost the same; the U.S. rate was slightly higher for accidents. U.S. and Canadian discharge rates for the infants under 1 year of age were not significantly different for pneumonia or the accidents, poisonings, and violence category.

Diarrheal diseases were among the important causes of infant deaths and discharge diagnoses in both countries, but while the infant mortality rate for diarrheal diseases was higher in the United States, the discharge rate for infants under 1 year

Table Q. Infant mortality rates by selected causes of death: United States and Canada, 1979

[Causes of death are coded according to the *Eighth Revision International Classification of Diseases, Adapted for Use in the United States* (ICDA–8)]

Cause of death and ICDA–8 code		*United States*	*Canada*
		Rate per 100,000 live births	
All causes[1]	000–999	1,378	1,195
Diarrheal diseases	009	21	12
Septicemia	038	33	13
Meningitis	320	16	9
Diseases of the heart	390–398, 402, 404, 410–429	25	4
Pneumonia, all forms	480–486	45	46
Hernia and intestinal obstruction	550–553, 560	15	14
Congenital anomalies	740–759	252	327
Anencephalus	740	23	30
Spina bifida	741	9	33
Congenital anomalies of the heart	746	85	98
Other congenital anomalies of the circulatory system	747	25	22
Congenital anomalies of the respiratory system	748	21	31
Congenital anomalies affecting multiple systems	759	41	33
All other congenital anomalies	742–745, 749–758	48	80
Certain causes of mortality in early infancy	760–769.2, 769.4–772, 774–778	660	504
Maternal conditions related to pregnancy and childbirth	762–769	91	74
Conditions of placenta	770	23	33
Birth injury without mention of cause	772	56	45
Hyaline membrane disease	776.1	80	67
Respiratory distress syndrome	776.2	100	68
Asphyxia of newborn, unspecified	776.9	89	69
All other anoxic and hypoxic conditions not elsewhere classifiable	776.0, 776.3–776.4	18	14
Immaturity, unqualified	777	110	89
All other conditions of newborn	760–761, 771, 774, 775, 778	93	43
Symptoms and ill-defined conditions	780–796	171	148
Accidents	E800–E949	38	35

[1]Includes causes of death not shown in table.

of age was higher in Canada. For hernia and intestinal obstruction, though, infant mortality rates were similar, as were the discharge rates of children under 1 year for inguinal hernia.

Septicemia, meningitis, and diseases of the heart were important as causes of infant deaths but were not major discharge diagnoses of children under 1 year of age. For each, the U.S. infant mortality rate was higher than the Canadian rate, 78 percent higher for meningitis, 2½ times higher for septicemia, and 6 times higher for diseases of the heart. On the other hand, several of the major discharge diagnoses of infants under 1 year were the cause of few infant deaths. These included otitis media, gastroenteritis and colitis, and all the respiratory diseases except pneumonia.

Neonatal mortality

Neonatal mortality rates (deaths in the first 27 days of life divided by live births) are presented by cause in table R. To compare neonatal mortality rates with newborn infant discharge rates, the causes selected are the same as the diagnoses shown in table H, with the addition of immaturity. For the neonatal period as a whole, congenital anomalies and anoxic and hypoxic conditions not elsewhere classifiable were the most important causes of death in both the United States and Canada. The Canadian neonatal mortality rate was higher for congenital anomalies, but the rate for anoxic and hypoxic conditions was higher in the United States. The U.S. and Canadian discharge rates of newborn infants were not significantly different for either condition.

The neonatal mortality rates were higher in the United States for five of the other seven cause of death categories. However, the discharge rates of U.S. newborn infants were higher only for two of these: immaturity and the residual category, conditions other than congenital anomalies and certain causes of perinatal mortality. Canada had a higher neonatal mortality rate for conditions of the placenta and umbilical cord, for which no U.S. discharge data were available, and a slightly higher rate for hemolytic disease of the newborn, for which the newborn infant discharge rate was higher in the United States.

The low neonatal mortality rates for hemolytic disease in both countries contrasted with the relatively high discharge rates of newborn infants with the diagnosis. The category, other conditions of the fetus or newborn, also presented a contrast. Though it was the leading diagnosis of sick newborn infants, it accounted for only 8 percent of neonatal mortality in the United States and 3 percent in Canada.

Along with anoxic and hypoxic conditions and congenital anomalies, immaturity and maternal conditions were important causes of death during the first day of life in both countries. For infants 1 to 7 days old, birth injury and the residual category followed anoxic and hypoxic conditions and congenital anomalies in importance as causes of death. In the 7-to-28 day period, the residual category had become the most important cause of death in the United States and the second most important cause in Canada, after congenital anomalies.

Mortality of children 1–14 years

The distribution of deaths by cause was different for children 1–14 years of age than for those under 1 year of age (table S). After the first year of life, accidents were the most important cause of children's deaths, accounting for approximately 40 percent of the deaths of children 1–4 years of age and over half of the deaths of those 5–14 years. The accident deaths were evenly split between motor vehicle and other types of accidents for children 5–14 years of age, but for those 1–4 years of age the other types of accidents were more important.

The second most important cause of death for children 1–4 years of age was congenital anomalies. Malignant neoplasms was the second most important cause for children 5–14 years. The U.S. and Canadian death rates for these, and most of the other causes, were similar, if not identical. Canadian children 1–4 years of age had a higher death rate for leukemia, while the death rates for U.S. children 1–4 years were higher for diseases of the heart, accidents, and homicide. The death rates for children 5–14 years were the same for each of the leading causes of death, except accidents.

The only conditions important both as causes of death and discharge diagnoses for the two age groups were accidents, congenital anomalies, and pneumonia. For children 5–14 years of age, the difference between the U.S. and Canadian death rates for accidents was consistent with the difference in dis-

Table R. Neonatal mortality rates by age and selected causes of death: United States and Canada, 1978

[Causes of death are coded according to the *Eighth Revision International Classification of Diseases, Adapted for Use in the United States* (ICDA–8)]

Cause of death and ICDA–8 code	Under 28 days		Under 1 day		1 to 7 days		7 to 28 days	
	United States	Canada	United States	Canada	United States	Canada	United States	Canada
	Rate per 100,000 live births							
All causes 000–999	949	805	511	439	287	240	150	126
Congenital anomalies 740–759	178	229	81	104	61	71	36	54
Maternal conditions 760–769	94	79	74	63	16	12	4	4
Conditions of placenta and umbilical cord 770–771	28	40	25	35	3	5	1	1
Birth injury without mention of cause 772	55	45	9	10	33	25	13	9
Hemolytic disease of newborn 774–775	6	8	4	4	2	3	-	1
Anoxic and hypoxic conditions not elsewhere classifiable 776	272	217	140	115	101	84	32	18
Immaturity 777	110	89	101	79	7	7	1	3
Other conditions of fetus or newborn 778	77	24	49	11	19	8	8	4
Conditions other than congenital anomalies and certain causes of perinatal mortality 000–738, 780–999	128	73	28	18	45	24	55	31

Table S. Death rates for children 1–14 years of age by age and selected causes of death: United States and Canada, 1978

[Causes of death are coded according to the *Eighth Revision International Classification of Diseases, Adapted for Use in the United States* (ICDA–8)]

Cause of death and ICDA–8 code		1–4 years		5–14 years	
		United States	Canada	United States	Canada
		Rate per 100,000 population			
All causes[1]		68	63	33	36
Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissue	140–209	5	6	4	4
Leukemia	204–207	2	3	2	2
All other malignant neoplasms	140–203, 208, 209	3	3	2	2
Diseases of the heart	390–398, 402, 404, 410–429	2	1	1	1
Pneumonia, all forms	480–486	3	3	1	1
Congenital anomalies	740–759	8	8	2	2
Accidents	E800–E949	28	27	17	20
Motor vehicle accidents	E810–E823	10	9	9	10
All other accidents	E800–E807, E825–E949	18	18	8	10
Homicide	E960–E978	3	2	1	1

[1] Includes causes of death not shown in table.

charge rates for the accidents, poisonings, and violence category. The Canadian death rate was 17 percent higher, and the Canadian discharge rate was 18 percent higher for this age group. For the 1–4 years age group, the U.S. death rate was 4 percent higher for accidents (10 percent higher for the entire accidents, poisonings, and violence category). However, the discharge rate of children 1–4 years for accidents, poisonings, and violence was 34 percent higher in Canada. Discharge rates for congenital anomalies, unlike death rates, were significantly higher in Canada for both children 1–4 and 5–14 years of age. The discharge rates of the countries for pneumonia, like the death rates, were not significantly different for either age group.

Discussion

Based on mortality and morbidity data, the argument could be made that U.S. adults had higher hospital discharge rates because they were less healthy than Canadian adults. For children under 15 years, though, the relationship between hospital use and health status was not consistent. Despite a lower discharge rate, the under 15 years age group as a whole had higher morbidity and mortality rates in the United States. Within the age group, the lower proportion of healthy newborn infants discharged from U.S. hospitals could be related to the higher U.S. neonatal mortality rate, and in Canada the higher discharge rate of children 5–14 years could be explained by their higher death rates. However, the higher infant mortality rates and death rates of children 1–4 years of age in the United States do not explain the lower U.S. discharge rates of children under 5 years, excluding newborn infants.

The relationships between discharge and death rates for specific conditions also varied. Some conditions, such as septicemia for infants under 1 year of age or malignant neoplasms for children 1–14 years, were important as causes of death but not as discharge diagnoses. Conditions that were leading discharge diagnoses often caused few children's deaths. In particular, respiratory diseases, which were the most important discharge diagnoses of children in both countries, were not, except for pneumonia, leading causes of children's deaths. Although Canadian children were hospitalized more frequently for respiratory diseases, children's respiratory disease death rates did not differ between the two countries. For conditions that were important both as discharge diagnoses and causes of death, such as accidents, poisonings, and violence, and congenital anomalies, the findings were mixed. Differences between the United States and Canada in death rates parallel differences in discharge rates for some age groups, but not for all.

These findings suggest that factors other than health status need to be considered to understand the difference in hospital use by children in the United States and Canada. Accordingly, characteristics of the U.S. and Canadian health services systems that may affect hospital use are examined in the next section.

Health services

Characteristics of the health services systems in the United States and Canada are examined in this section for evidence for two possible explanations for the lower levels of hospital use by children in the United States. One of the possible explanations is that ambulatory care is "substituted" for inpatient care in the treatment of U.S. children; that is, U.S. children may be treated on an ambulatory basis for conditions that lead to the hospitalization of children in Canada. The second possible explanation is that U.S. children may have problems obtaining access to hospital care that Canadian children do not have. Barriers to hospital care could result in some U.S. children not receiving inpatient care when they need it.

Supply and distribution of resources

The substitution explanation is suggested by the statistics on supply of hospital beds and physicians in table T. Canada had a higher rate of total hospital beds and a rate of pediatric beds twice that in the United States. The rate of all physicians did not differ between the two countries, but the United States had a higher number of physicians certified by specialty boards as pediatricians per 10,000 population of children under 15 years of age. Pediatricians did not provide all children's health services in either country, but previous research indicates that pediatricians may be more likely than other types of physicians to treat children on an ambulatory rather than inpatient basis.[19]

Table T. Rates of short-stay hospital beds and physicians: United States and Canada, 1977–78

[In the United States hospital data are for all non-Federal short-stay hospitals registered with the American Hospital Association. In Canada hospital data are for all short-stay hospitals]

Health resource	*United States*	*Canada*
	Rate per 10,000 population	
Beds	44	54
Physicians[1]	18	18
	Rate per 10,000 population under 15 years	
Pediatric beds	[2]11	25
Pediatricians[3]	3.3	2.1

[1]U.S. data are for active non-Federal physicians (MD's and DO's). Canadian data are for active civilian physicians (MD's).
[2]Estimates of pediatric beds have been made for nonreporting hospitals. For details see appendix II.
[3]Data are for physicians certified as pediatricians by specialty boards as of December 31, 1977.

SOURCES: American Hospital Association: *Hospital Statistics*, 1979 Edition. Chicago, 1979. Statistics Canada, Health Division: Unpublished 1978 data from the Institutional Statistics Section; American Medical Association: *Physician Distribution and Medical Licensure in the U.S., 1978*. Chicago, 1979 (Copyright 1979. Used with the permission of the American Medical Association); National Center for Health Statistics: *Health, United States, 1982*. DHHS Pub. No. (PHS) 83-1232. Public Health Service. Washington. U.S. Government Printing Office, Dec. 1982; Medical education in the United States, 1977–1978. *JAMA* 240(26), Dec. 22/29, 1978, p. 2841 (Copyright 1978: Used with the permission of the American Medical Association); Department of National Health and Welfare: *Canada Health Manpower Inventory, 1978* and *1979*. Ottawa, 1978 and 1979.

Hospital beds

Slightly over half of all short-stay hospitals in the United States maintained pediatric units in 1978 (table U). Three-fourths of the Canadian short-stay hospitals had pediatric units. The distribution of pediatric units by hospital bed size differed markedly in the two countries. In the United States, the proportion of hospitals with pediatric units increased steadily with hospital bed size. Only 13 percent of the smallest hospitals had pediatric units, but over three-fourths of the hospitals with 200 or more beds had the units, and more of the largest hospitals, 86 percent, had pediatric units than any other bed-size category. In Canada, over half of the smallest hospitals had pediatric units, and over 80 percent of the hospitals with 25–199 beds had the units. The Canadian hospitals most likely to have pediatric units were those with 50–99 beds, while the proportion of the largest hospitals with pediatric units was below the average for all sizes of hospitals.

Table U. Percent of short-stay hospitals with pediatric units by bed size: United States, 1978; Canada, 1977–78

[Data are for short-stay non-Federal hospitals registered with the American Hospital Association in the United States, and for short-stay hospitals in Canada]

Bed size	*United States*	*Canada*
	Percent with pediatric units	
All sizes	52.2	[1]75.5
500 beds and over	85.8	69.8
400–499 beds	84.3	88.9
300–399 beds	84.0	81.1
200–299 beds	77.3	78.8
100–199 beds	57.3	84.6
50–99 beds	36.5	90.6
25–49 beds	23.7	87.4
6–24 beds	13.1	[1]53.4

[1]Includes 58 hospitals with less than 6 beds, one of which has a pediatric unit.

SOURCES: American Hospital Association: *Hospital Statistics*, 1979 Edition. Chicago, 1979; Statistics Canada, Health Division: Unpublished 1978 data from the Institutional Statistics Section.

The wider distribution of pediatric units in Canadian hospitals could be interpreted as evidence of easier access to inpatient care for Canadian than U.S. children. However, allotting beds for the exclusive use of children in most Canadian hospitals could also result in admissions of Canadian children for relatively minor conditions.[43]

The supply of hospital beds and pediatric hospital beds in geographic divisions is shown for the United States in table W and for Canada in table Y. The States making up each U.S. division are listed in appendix II, table VIII. For Canada each Province is a division, except the two smallest, which are combined to form one division.

In the United States the highest rate of hospital beds was in the West North Central division. Saskatchewan had the highest rate in Canada. It is interesting to note that Saskatchewan borders on States in the West North Central division. Quebec had the lowest hospital bed rate in Canada; and the two western divisions, Mountain and Pacific, had the lowest rates in the United States.

The rates by division of pediatric beds per 10,000 population of children under 15 years of age followed a pattern similar to the total bed rates in Canada. Saskatchewan had the highest pediatric bed rate, Quebec the lowest, and the divisions in between ranked much the same on both bed rates. However, in the United States no relationship was evident between the two bed rates by division. For example, three divisions had higher pediatric bed rates than the West North Central division, and two had lower pediatric bed rates than the Mountain or Pacific divisions.

The divisions in each country were ranked according to the discharge rates of children under 15 years, which are shown in tables W and Y. These rankings were compared with

Table W. Rates of hospital beds, pediatric beds, physicians, pediatricians, and hospital discharges for patients under 15 years of age, by geographic division: United States, 1978

Division	Hospital beds		Physicians		Hospital discharges under 15 years[5]
	Total[1]	Pediatric[2]	Total[3]	Pediatricians[4]	
	Rates per 10,000 population[6]				
New England	42	13	22	5.4	540
Middle Atlantic	46	13	21	5.3	665
East North Central	47	13	15	3.2	793
West North Central	59	12	15	2.7	1,009
South Atlantic	43	11	17	4.0	561
East South Central	48	8	12	2.6	790
West South Central	45	8	14	2.7	709
Mountain	37	11	15	3.3	702
Pacific	36	9	20	4.7	510

[1]Short-stay non-Federal hospitals registered with the American Hospital Association.
[2]Hospitals registered with the American Hospital Association.
[3]Active non-Federal physicians (MD's).
[4]Non-Federal physicians (MD's) in pediatric practice, excluding pediatric residents.
[5]Non-Federal short-stay hospital discharges excluding newborn infants.
[6]For pediatric beds, pediatricians, and hospital discharges under 15 years, rates per 10,000 population under 15 years of age.

SOURCES: American Hospital Association: *Hospital Statistics*, 1979 Edition. Chicago, 1979. American Medical Association: *Physician Distribution and Medical Licensure in the U.S., 1978*. Chicago, 1979 (Copyright 1979; Used with the permission of the American Medical Association); Division of Health Care Statistics, National Center for Health Statistics: Unpublished 1978 data from the National Hospital Discharge Survey.

Table Y. Rates of hospital beds, pediatric beds, physicians, pediatricians, and hospital discharges for patients under 15 years of age, by geographic division: Canada, 1977–78

Division	Hospital beds[1]		Physicians		Hospital discharges under 15 years[4]
	Total	Pediatric	Total[2]	Pediatricians[3]	
	Rates per 10,000 population[5]				
Newfoundland and Prince Edward Island	55	35	14	1.5	1,196
Nova Scotia	67	39	18	1.7	1,162
New Brunswick	62	31	11	1.0	1,156
Quebec	47	18	18	2.5	726
Ontario	53	23	19	2.3	906
Manitoba	64	29	18	2.7	1,087
Saskatchewan	76	43	15	1.4	1,775
Alberta	61	36	16	1.8	1,247
British Columbia	60	25	19	2.4	951

[1]General and allied special hospitals excluding rehabilitation and extended care hospitals.
[2]Active civilian physicians (MD's).
[3]Active civilian board certified pediatricians (MD's).
[4]Short-stay hospital discharges excluding newborn infants.
[5]For pediatric beds, pediatricians, and hospital discharges under 15 years, rates per 10,000 population under 15 years of age.

SOURCES: Statistics Canada, Health Division: *Hospital Annual Statistics, 1977–78*. Ottawa, June 1981; Department of National Health and Welfare: *Canada Health Manpower Inventory, 1979*. Ottawa, 1979; Statistics Canada, Health Division: Unpublished 1978 data from the Institutional Care Statistics Section.

the rankings of the divisions by total bed rates and pediatric bed rates, using Spearman's r_s as a test of association. Unrounded data were used for the rankings, which resulted in no cases of tied rankings.

The associations between rankings of the divisions varied in the United States and Canada, as is illustrated in figures 9 and 10. In the United States a positive, statistically significant relationship was found between total hospital bed rates and children's discharge rates ($r_s = .850$), but no relationship existed between pediatric bed rates and children's discharge rates ($r_s = -.100$). In Canada the relationship between total hospital bed rates and children's discharge rates was not statistically significant ($r_s = .667$), but a very strong relationship was found between pediatric bed rates and children's discharge rates ($r_s = .950$).

These findings suggest that the supply of pediatric beds is an important factor in an explanation of Canadian children's hospital use. The lower supply and less widespread distribution of pediatric beds in U.S. hospitals probably does not create a substantial barrier to children's hospital use in the United States, The relationship between the supply of total hospital beds and children's discharge rates in the United States implies that U.S. children are frquently admitted to general hospital beds.

Physicians

The supply of physicians and pediatricians in the geographic divisions of the United States and Canada is also shown in tables W and Y. In both countries the rankings of the divisions according to physician and pediatrician rates were similar. The New England, Middle Atlantic, and Pacific divisions of the United States had the highest rates of physicians and pediatricians. The East South Central division had the lowest rates. In Canada five Provinces had high rates of physicians, and four of the five also had the highest rates of pediatricians. New Brunswick had the lowest rates of physicians and pediatricians.

The associations between rankings of the divisions by physician rates and rankings by children's discharge are illustrated in figure 11. The relationships were negative and statistically significant in both countries, but the relationship was stronger in the United States ($r_s = -.783$) than in Canada ($r_s = -.683$). The associations between the rankings of the divisions by rates of pediatricians and those by children's discharge rates are shown in figure 12. As with physician rates, the relationships were negative in both countries, but in Canada ($r_s = -.667$) the relationship was not statistically significant, while in the United States ($r_s = -.833$) it was both significant and stronger than the association between physician rates and children's discharge rates.

The inverse relationships between supply of physicians and children's hospital use suggest that substitution may take place between physician and inpatient services for children. In the United States pediatricians appear more likely to reduce children's hospital use than physicians generally. Pediatricians

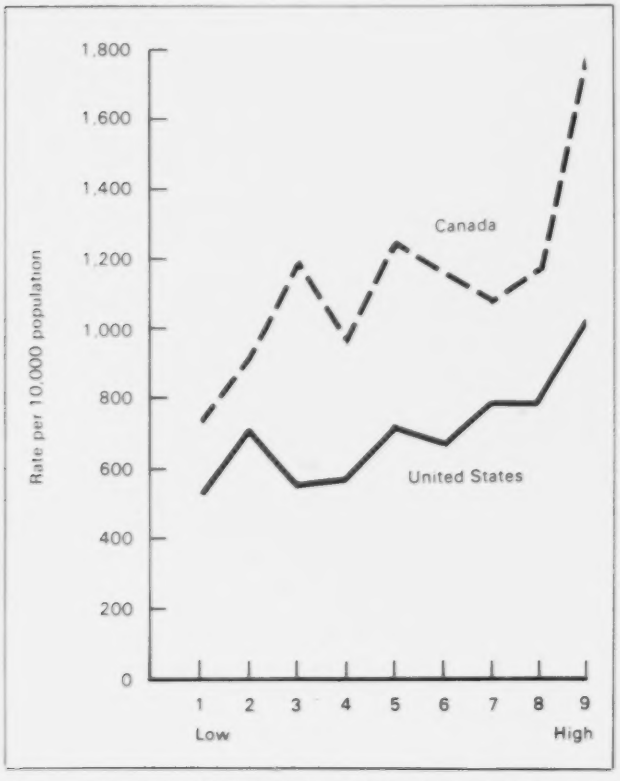

Figure 9. Rates per 10,000 population for patients under 15 years, excluding newborn infants, discharged from short-stay hospitals by geographic divisions ranked from low to high on the basis of rates of hospital beds: United States, 1978; Canada, 1977–78

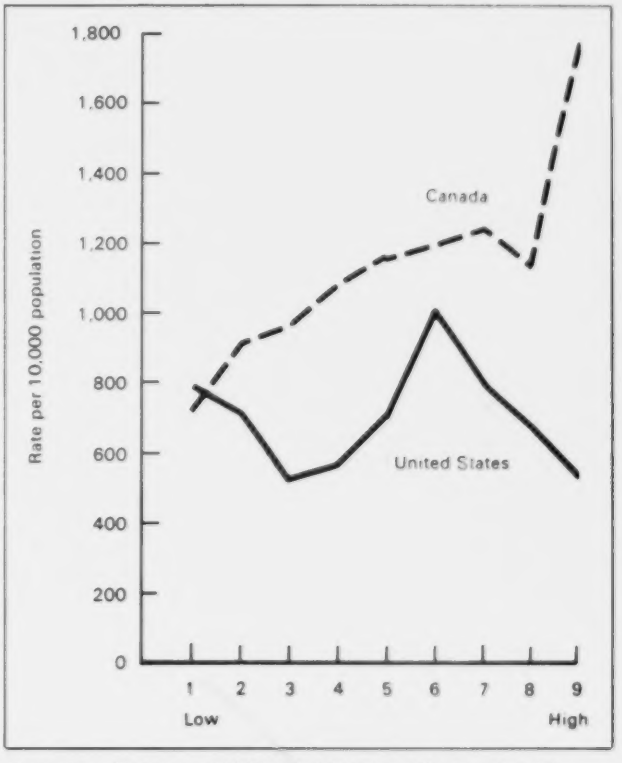

Figure 10. Rates per 10,000 population for patients under 15 years, excluding newborn infants, discharged from short-stay hospitals by geographic divisions ranked from low to high on the basis of rates of pediatric hospital beds: United States, 1978; Canada, 1977–78

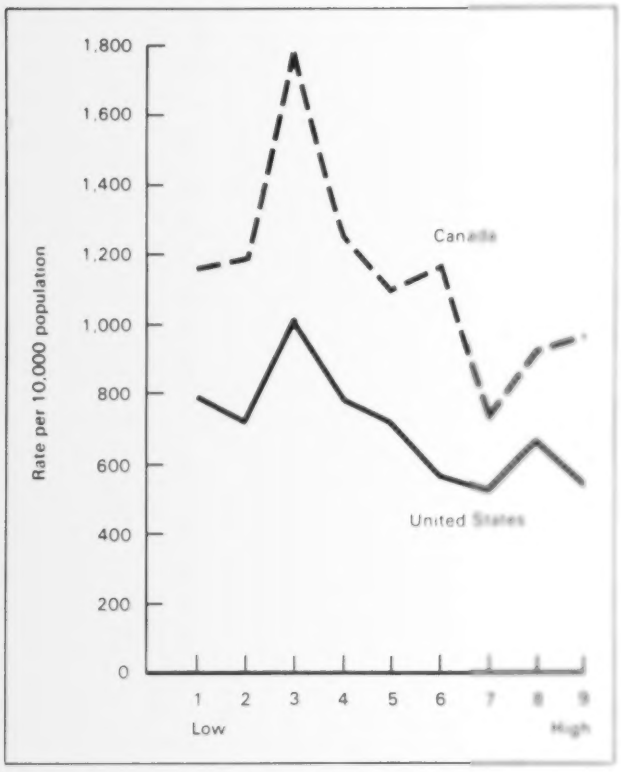

Figure 11. Rates per 10,000 population for patients under 15 years, excluding newborn infants, discharged from short-stay hospitals by geographic divisions ranked from low to high on the basis of rates of physicians: United States and Canada, 1978

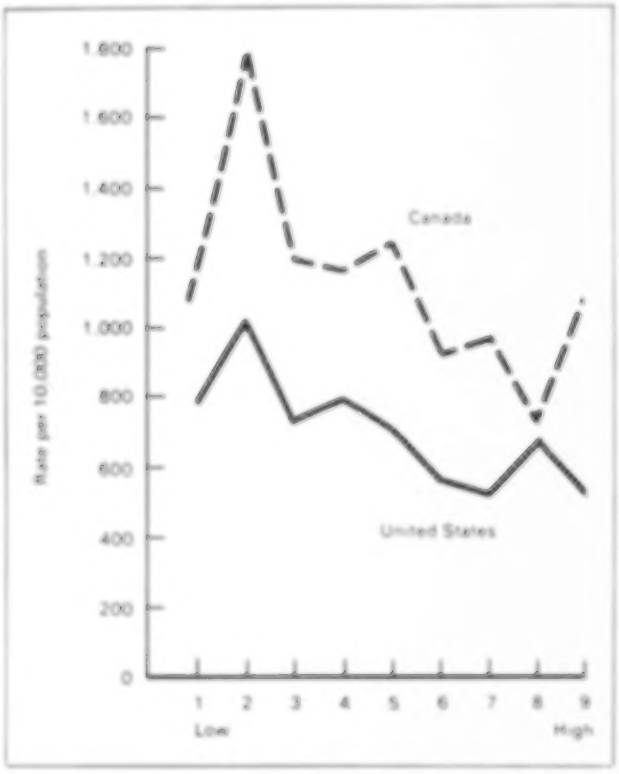

Figure 12. Rates per 10,000 population for patients under 15 years, excluding newborn infants, discharged from short-stay hospitals by geographic divisions ranked from low to high on the basis of rates of pediatricians: United States and Canada, 1978

do not appear to be as important in Canada, perhaps because of their lower supply, which could result in more children being cared for by other types of physicians.

Selected diagnoses by division

The discharge rates by geographic division for children under 15 years of age with a diagnosis in the categories of diseases of the respiratory system and accidents, poisoning, and violence are shown in table Z for the United States and in table AA for Canada. It is tempting to attribute Canadian children's higher discharge rates for respiratory diseases to Canada's cold northerly climate. However, within the United States the more northern divisions did not necessarily have the highest discharge rates for respiratory diseases. For instance,

Table Z. Rates of hospital discharges for patients under 15 years with selected diagnoses, by geographic division: United States, 1978

[Data are for first-listed diagnoses in short-stay non-Federal hospitals. Data exclude newborn infants and are coded using the *Eighth Revision International Classification of Diseases, Adapted for Use in the United States* (ICDA–8)]

Division	*Diseases of the respiratory system*[1]	*Accidents, poisonings, and violence*[2]
	Rate per 10,000 population	
New England	148	93
Middle Atlantic	185	96
East North Central	254	99
West North Central	347	152
South Atlantic	173	78
East South Central	296	96
West South Central	229	91
Mountain	200	123
Pacific	149	89

[1]ICDA–8 codes 460–519.
[2]ICDA–8 codes 800–999.

Table AA. Rates of hospital discharges for patients under 15 years with selected diagnoses, by geographic division: Canada, 1978

[Data are for principal or primary diagnoses in short-stay hospitals. Data exclude newborn infants and are coded using the *Eighth Revision International Classification of Diseases, Adapted for Use in the United States* (ICDA–8)]

Division	*Diseases of the respiratory system*[1]	*Accidents, poisonings, and violence*[2]
	Rate per 10,000 population	
Newfoundland and Prince Edward Island	445	126
Nova Scotia	490	123
New Brunswick	465	113
Quebec	236	71
Ontario	338	110
Manitoba	451	130
Saskatchewan	742	212
Alberta	478	161
British Columbia	334	153

[1]ICDA–8 codes 460–519.
[2]ICDA–8 codes 800–999.

the East South Central division had a children's discharge rate for respiratory diseases significantly higher than the New England and Middle Atlantic divisions.

The evidence is stronger that children's discharge rates for diseases of the respiratory system are related to the supply of health resources. In the United States the rankings of the divisions by children's respiratory disease discharge rates were positively related to rankings by total hospital bed rates ($r_s = .833$), and negatively related to rankings by physician rates ($r_s = -.867$) and pediatrician rates ($r_s = -.917$). The relationship between respiratory disease discharge rates and pediatric bed rates was not statistically significant. In Canada children's discharge rates for respiratory diseases were positively related to both total hospital bed rates ($r_s = .883$) and pediatric bed rates ($r_s = .933$), but the associations with physician rates and pediatrician rates were not statistically significant.

In contrast, the associations between the rankings of the divisions by children's discharge rates for accidents, poisonings, and violence and rankings by hospital bed rates, pediatric bed rates, physician rates, and pediatrician rates all failed to reach statistical significance in both the United States and Canada. The lack of relationships suggests that less variability exists in the treatment of children for accidents, poisonings, and violence than in cases of respiratory diseases.

Physician utilization

While it was not possible to compare the utilization of pediatricians in the United States and Canada, data on the utilization of all physicians were available from the national health interview surveys in the two countries. According to the two surveys, patients were most likely to visit physicians in the physicians' offices (table BB). However, the percent of contacts in physicians' offices was higher in Canada, both for the under 15 years and the 15 years and over age groups. Hospital outpatient departments accounted for a higher percent of physician contacts for both age groups in the United States. Hospital emergency departments were more likely to be the place of a physician contact for patients 15 years of age and over in the United States, but approximately the same percent of children's physician contacts were in hospital emergency departments in both countries.

The greater proportion of physician contacts in hospital outpatient departments might indicate less accessible physician services in the United States, which could translate into a barrier to hospital care. One measure of physician accessibility is the percent of the population with a physician contact in a year, which is shown in table CC. For persons of all ages, the percent with a physician contact was higher in Canada, but the difference was found in the population 15 years of age and over. The percents of children under 15 years of age with a physician contact were almost identical in the two countries, as were the percents of children under 5 and 5–14 years of age. Thus, physicians appear to be equally accessible to children in the United States and Canada.

If ambulatory care is substituted for inpatient care in the treatment of U.S. children, they would be expected to have a higher average number of physician contacts. Statistics on physician contacts in the two countries are shown in table DD. For comparability, the average number of physician contacts per year was based on interview questions about the number of contacts in the previous 12 months, although in the United States, a 2-week recall period is generally preferred. Respondents are thought to be less likely to forget contacts in the shorter time period. In 1978, for example, use of the 2-week recall period resulted in a 24-percent larger U.S. estimate of physician contacts per person for all ages and a 40-percent larger estimate for children under 15 years of age. Telephone contacts,

Table CC. Percent of population with a physician contact in a year by age: United States, 1978; Canada, 1978–79

[Data are based on household interview surveys of the civilian noninstitutionalized population in the United States and of the noninstitutionalized population of the Provinces in Canada. Further information about the surveys is provided in appendix I]

Age group	United States	Canada
	Percent	
All ages	75.4	76.8
Under 15 years	77.1	77.4
Under 5 years	90.1	90.4
5–14 years	71.4	71.6
15 years and over	74.8	76.6

Table BB. Percent distribution of physician contacts by place of contact, according to age: United States, 1978; Canada, 1978–79

[Data are based on household interview surveys of the civilian noninstitutionalized population in the United States and of the noninstitutionalized population of the Provinces in Canada. Further information about the surveys is provided in appendix I]

Place of contact[1]	All ages		Under 15 years		15 years and over	
	United States	Canada	United States	Canada	United States	Canada
	Percent distribution					
All places	100.0	100.0	100.0	100.0	100.0	100.0
Physician's office	76.2	80.7	75.6	80.5	76.3	80.8
Hospital outpatient department	10.2	6.7	8.2	5.7	10.7	6.9
Hospital emergency department	5.2	5.8	7.9	7.8	4.6	5.2
Other and unknown places	8.4	6.9	8.3	6.0	8.4	7.1

[1] Excludes physician contacts of hospital inpatients and telephone contacts.

Table DD. Average number of physician contacts in a year by age: United States, 1978; Canada, 1978–79

[Data are based on household interview surveys of the civilian noninstitutionalized population in the United States and of the noninstitutionalized population of the Provinces of Canada. Further information about the surveys is provided in appendix I]

Age group	United States	Canada
	Number of contacts per person per year	
All ages	3.8	3.3
Under 15 years	3.1	2.6
Under 5 years	4.3	3.4
5–9 years	2.9	2.5
10–14 years	2.2	2.2
15 years and over	4.1	3.5

which might be particularly difficult to recall over a long time period, accounted for 18 percent of the contacts of U.S. children under 15 years of age when the 2-week recall period was used.

Also, to improve comparability, an adjustment was made in the Canadian data to exclude physician visits to hospital inpatients, which were not included in average number of U.S. contacts. The total number of contacts in Canada was reduced by the percent of most recent contacts that were visits to hospital inpatients, which was 3.7 percent for all ages and 4.2 percent for children under 15 years of age. These adjustments did not make the statistics totally comparable. There are other differences in survey methodology, such as the use of an inputation procedure for nonresponse in the United States but not in Canada.

As is shown in table DD, the average number of contacts with a physician in a year was reported to be higher in the United States than in Canada. Children under 15 years of age and persons 15 years of age and over had higher average numbers of contacts with physicians in the United States. Within the groups under 15 years of age, U.S. children under 5 and 5–9 years of age were reported to average more physician contacts than Canadian children. These findings are consistent with the thesis that physician use is substituted for hospital use in the treatment of U.S. children. There was no difference, though, in the averages for children 10–14 years of age.

Health insurance

The costs of hospital care could present a barrier to hospital use for persons without health insurance, and health insurance coverage differs in the United States and Canada. Canada enacted a national hospital insurance program in 1958 and a national medical care insurance program in 1968. Almost all Canadian residents are eligible for coverage by the programs, exceptions being the armed forces, Royal Canadian Mounted Police, and inmates of Federal prisons. Insurance coverage is compulsory for all Canadian residents except in two Provinces, and even in those Provinces more than 99 percent of the population participates in the programs.[44]

In the United States most of the population was covered by some form of health insurance in 1978, but children under 15 years of age were less likely to be insured than persons 15 years of age and over (table EE). Furthermore, within the group under 15 years of age, the percent with health insurance was lowest for children under 1 year, and lower for children 1–4 years than for those 5–14 years of age.

Private health insurance covered the largest percent of the U.S. population in all age groups. As with all forms of insurance, private plans provided coverage for a higher percent of persons 15 years of age and over than of children under 15 years, and within the group under 15 years of age, the percent with private insurance coverage was highest for children 5–14 years of age, lowest for children under 1 year.

Medicare, a Government insurance program primarily providing health insurance protection to persons 65 years of age and over, was the second most common type of insurance for persons 15 years of age and over. Not surprisingly, Medicare covered very few children. Medicaid, a government health insurance program that provides benefits to low-income persons, was the second most common type of insurance for children under 15 years of age, but it covered a smaller percent of persons 15 years of age and over. Children under 5 years were more likely to have Medicaid insurance coverage than children 5–14 years of age. Military insurance programs covered a larger percent of persons 15 years of age and over than of children under 15 years of age.

The percent of the U.S. population with some form of health insurance coverage varied by income (table FF). Persons with an annual family income of less than $10,000 were less likely to have health insurance. In addition, children were less

Table EE. Percent distribution of population by health insurance coverage, according to age: United States, 1978

[Data are based on a household interview survey of the civilian noninstitutionalized population. Further information about the survey is provided in appendix I]

Health insurance coverage	Under 1 year	1–4 years	5–14 years	Under 15 years	15 years and over
	Percent distribution				
Total population	100.0	100.0	100.0	100.0	100.0
Insured	81.8	86.9	88.6	87.8	89.4
Private insurance	64.9	70.7	76.2	74.1	78.7
Medicare	*0.3	*0.0	*0.1	0.1	14.4
Medicaid	13.5	13.7	11.1	11.9	5.4
Military	4.4	4.1	3.6	3.8	6.2
Not insured	15.9	11.7	10.2	10.9	9.7
Unknown insurance status	2.3	1.4	1.1	1.3	1.0

NOTE: The percent insured is less than the total of the percents with specific types of insurance because persons can have more than one type of insurance coverage.

Table FF. Percent of population with health insurance by age and family income: United States, 1978

[Data are based on a household interview survey of the civilian noninstitutionalized population. Further information about the survey is provided in appendix I]

Annual family income	Under 15 years	15 years and over
	Percent	
All incomes	87.8	89.4
Less than $5,000	76.2	80.0
$5,000–$9,999	75.1	82.1
$10,000–$14,999	88.0	89.9
$15,000–$24,999	95.3	94.9
$25,000 and over	96.2	96.0
Income unknown	83.1	84.9

likely to be insured than persons 15 years of age and over in each of the three income groups below $15,000. These findings suggest that U.S. children are more likely to have a financial barrier to hospital care than are the rest of the U.S. population, or the Canadian population.

To further explore the question of financial barriers, the rate of hospital episodes was compared by age, income, and insurance status (table GG). A hospital episode is defined as a continuous period of stay of 1 night or more in a hospital as an inpatient, except the period of stay of a well newborn infant. The statistics were taken from the 1978 National Health Interview Survey, which did not cover the institutionalized population or collect information on persons who died during the reference period. Because of differences in the definition, coverage, and sampling procedures, the rates of hospital episodes were lower than the hospital discharge rates obtained from the U.S. National Hospital Discharge Survey.

For all income groups, the difference in the rates of hospital episodes of children under 15 years of age who were insured and not insured was not statistically significant. For persons 15 years of age and over, though, the hospital episode rate was 45 percent higher for the insured. In both age groups, the hospital episode rate was significantly higher for persons with an annual family income of less than $10,000 than for persons with incomes of $10,000 and over. Within the under $10,000 income group, persons with insurance had higher hospital episode rates than persons without insurance. Children under 15 years with insurance had a 42-percent higher rate than those without insurance, and persons 15 years of age and over with insurance had an 83-percent higher rate than those without insurance. Within the $10,000 and above income group, children's rates of hospital episodes were virtually the same whether or not they were insured, but persons 15 years of age and over with insurance had a 32-percent higher rate of hospital episodes than those without insurance.

Thus, all U.S. persons 15 years of age and over without insurance, and U.S. children without insurance in families with incomes of less than $10,000, appear to have a financial barrier to hospital care. In 1978, 6 percent of U.S. children under 15 years of age and almost 9 percent of U.S. children under 1 year of age fell into the not-insured, under $10,000 income category.

Table GG. Rates of hospital episodes by annual family income, health insurance status, and age: United States, 1978

[Data are based on a household interview survey of the civilian noninstitutionalized population. Further information about the survey is provided in appendix I]

Annual family income and health insurance status	Under 15 years	15 years and over
	Rate per 10,000 population	
All incomes[1,2]	628	1,521
Insured	641	1,573
Not insured	543	1,088
Under $10,000[2]	735	1,985
Insured	786	2,165
Not insured	554	1,185
$10,000 and over[2]	608	1,313
Insured	612	1,333
Not insured	607	1,011

[1]Includes hospital episodes of persons whose family income was unknown.
[2]Includes hospital episodes of persons whose insurance status was unknown.

Discussion

Comparison of health services in the United States and Canada produced some evidence to support both the explanations that were explored for lower hospital use by U.S. children. The possibility that ambulatory care was substituted for inpatient care in the treatment of U.S. children was suggested by the higher rate of pediatricians in the United States than in Canada and the inverse relationships between the rates of physicians and pediatricians and children's discharge rates by geographic division. The higher average number of physician contacts per person for U.S. than Canadian children also supported the substitution explanation.

The possibility that U.S. children may have experienced barriers to hospital care that did not affect Canadian children was not indicated by the statistics on supply and distribution of health resources or physician use. Canada had a higher rate of pediatric hospital beds and the beds were more widely distributed in all sizes of hospitals than in the United States. However, the positive relationship between total hospital beds and children's discharge rates for the geographic divisions of the United States suggested that U.S. children were readily admitted to nonpediatric beds. Despite a different distribution of the place of physician contacts in the United States and Canada, physicians appeared to be equally accessible to children in the two countries, because the same proportions of U.S. and Canadian children saw a physician in a year.

The possible barrier to hospital care for some U.S. children was financial. Canadian children were virtually all covered by a national hospital insurance program, but a portion of U.S. children had no health insurance coverage. Younger children and children in lower income families, who have comparatively high rates of hospital use, were particularly likely to lack insurance. The lower hospital episode rates of the lower income U.S. children who had no insurance raises the concern that these children may not have been able to obtain hospital care when they needed it because of its cost.

Summary

The United States has a hospital discharge rate higher than many other Western industrialized countries, but the discharge rate of U.S. children is comparatively low. This comparison of hospital use by children in the United States and Canada was undertaken to explore explanations for the low U.S. discharge rate.

U.S. children were found to have lower discharge rates than Canadian children across most age, sex, and diagnostic groups. These widespread differences suggested that some general characteristic of children or their health services varied between Canada and the United States. However, particularly large differences in discharge rates for some conditions also seemed to indicate specific variations in the incidence of certain conditions or medical practices. Most important was the respiratory diseases category in which U.S. children had much lower discharge rates for conditions such as upper respiratory infections and hypertrophy of tonsils and adenoids but rates similar to Canadian children for pneumonia. The lower frequency of tonsillectomy with or without adenoidectomy for U.S. children also stood out, especially because with the procedure excluded there were no differences in the discharge rates of U.S. and Canadian children with surgical procedures.

The findings on the general health status of U.S. and Canadian children and on the incidence of specific conditions in the United States and Canada did not provide a complete explanation for the differences in children's discharge rates. Infant mortality was higher in the United States, which helped explain the higher proportion of U.S. newborn infants who were not healthy, but shed no light on the higher discharge rate of Canadian children under 1 year, excluding newborn infants. Children 1–4 years of age had a higher death rate, and children 5–14 years of age a lower death rate in the United States than in Canada, which did not explain why the discharge rates for both age groups were lower in the United States. The higher average numbers of disability days and bed days reported for U.S. children also were not consistent with their lower discharge rates. Except for pneumonia, respiratory diseases were not a major cause of death for children in either country, and differences in death rates for respiratory diseases, including pneumonia, were slight.

Evidence was found that ambulatory care may be substituted for the inpatient care of children in the United States. Canada had a higher rate of total hospital beds and pediatric beds, which could encourage hospital use. The United States had a higher rate of pediatricians, who are thought to be especially likely to treat children on an ambulatory rather than inpatient basis. A higher average number of physician contacts per year was also reported for children under 10 years of age in the United States. An emphasis on treating U.S. children on an ambulatory basis whenever possible could help account for both the generally lower children's discharge rates in the United States and the dramatically lower rates for less serious conditions, such as hypertrophy of tonsils and adenoids and upper respiratory infections.

However, there were also indications that some U.S. children may have confronted financial barriers to hospital care, unlike Canadian children who were virtually all covered by health insurance programs. U.S. children under 15 year of age were significantly more likely than the population as a whole to be uninsured. U.S. children in families with less than $10,000 annual income were more likely to be uninsured than other children. Among U.S. children in families with an annual income less than $10,000, those without insurance coverage had a significantly lower rate of hospital episodes than those with coverage, suggesting that lack of insurance could have prevented some of the uninsured from being hospitalized when they needed inpatient care.

Thus, the lower discharge rate for U.S. children should be considered both a positive finding and a source of concern. The evidence that ambulatory care substitutes for inpatient care in the treatment of U.S. children is positive, because hospital care is not only costly but can result in emotional problems for children. However, the lack of insurance and indications of poorer health status for young children in the United States should be of concern to health policymakers. Additional research is needed to analyze the relative contributions of the positive and negative factors to children's hospital use. A better understanding of these factors should be of value to children in the United States and other countries of the world.

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Table 1. Discharge rate and average length of stay for patients under 15 years of age discharged from short-stay hospitals, by age and selected diagnostic categories: United States and Canada, 1978

[For the United States, data are for first-listed diagnoses in non-Federal hospitals. For Canada, data are for principal or primary diagnosis in all short-stay hospitals. Data from both countries exclude newborn infants and are coded using the *Eighth Revision International Classification of Diseases, Adapted for Use in the United States* (ICDA–8)]

Diagnostic category and ICDA–8 code	Under 15 years		Under 1 year		1–4 years		5–14 years		Under 15 years		Under 1 year		1–4 years		5–14 years	
	United States	Canada	United States	Canada	United States	Canada	United States	Canada	United States	Canada	United States	Canada	United States	Canada	United States	Canada
	Rate per 10,000 population								Average length of stay in days							
All conditions	666	953	2,051	3,066	838	1,342	480	627	4.4	5.3	6.0	7.5	4.0	4.8	4.1	4.6
Infective and parasitic diseases 001–136	57	94	308	599	76	146	28	30	3.9	5.8	4.7	6.8	4.0	5.3	3.2	4.8
Diarrheal disease 009	26	57	138	421	39	93	12	12	3.6	5.4	4.4	6.4	3.5	4.8	2.8	3.8
Neoplasms 140–239	13	12	37	16	11	13	11	11	6.7	8.5	7.9	10.1	5.9	8.7	6.7	8.2
Endocrine, nutritional and metabolic diseases 240–279	12	18	50	128	12	13	8	10	7.0	8.8	6.4	8.6	9.0	9.7	6.4	8.7
Diseases of the blood and blood-forming organs 280–289	13	13	*22	26	10	13	13	12	5.0	5.4	*6.7	9.3	4.9	6.4	4.8	4.3
Mental disorders 290–319	9	9	*	10	*	6	10	10	13.7	17.5	*	8.7	*	18.8	15.3	18.1
Diseases of the nervous system and sense organs 320–389	59	67	119	160	97	104	40	46	3.3	4.8	5.6	7.5	3.2	4.4	2.7	4.2
Otitis media without mention of mastoiditis 381	30	33	59	99	56	57	18	19	2.1	3.7	3.2	6.0	2.0	4.0	1.7	2.5
Diseases of the circulatory system 390–458	8	4	47	13	*6	3	5	4	10.5	8.7	11.9	10.2	*12.7	7.8	8.4	8.6
Diseases of the respiratory system 460–519	210	359	619	1,124	326	617	133	199	3.6	4.3	5.0	7.0	3.8	4.2	2.9	2.9
Upper respiratory infections, except influenza 460–465	30	78	123	382	62	164	10	20	3.7	4.3	3.9	5.4	3.5	4.0	3.9	3.4
Acute bronchitis and bronchiolitis 466	20	32	160	257	34	51	3	5	4.4	6.0	4.8	7.0	3.9	5.2	4.4	4.4
Influenza 470–474	4	6	*	21	*7	8	3	4	3.4	4.4	*	6.1	*3.2	4.3	3.4	3.6
Pneumonia, all forms 480–486	47	49	209	241	90	96	18	16	5.5	7.4	5.8	9.1	5.5	7.1	5.3	6.1
Bronchitis, chronic and unqualified 490–491	13	27	55	145	25	54	5	7	4.0	6.2	4.8	7.3	3.5	5.4	3.8	5.6
Asthma 493	12	30	*17	28	22	58	8	20	3.9	4.4	*5.7	7.5	3.7	4.3	3.7	4.1
Hypertrophy of tonsils and adenoids 500	73	122	*	5	74	163	79	118	1.9	1.9	*	3.2	1.8	1.8	1.9	1.9
Diseases of the digestive system 520–577	68	73	260	213	70	74	50	60	4.2	4.6	5.3	5.8	3.4	3.9	4.1	4.5
Diseases of oral cavity, salivary glands, and jaws 520–529	6	11	*	8	12	16	5	10	2.3	2.7	*	5.2	2.3	3.2	2.2	2.2
Diseases of esophagus, stomach, and duodenum 530–537	6	7	37	34	*	7	4	5	4.5	4.8	5.4	7.1	*	3.8	3.7	4.0
Appendicitis 540–543	15	19	*	1	*	3	21	27	5.0	5.7	*	14.5	*	8.9	4.9	5.5
Inguinal hernia 550, 552	17	16	90	79	24	24	8	8	2.2	2.9	2.2	3.4	2.0	2.6	2.4	2.8
Other hernia of abdominal cavity 551, 553	4	4	*18	15	*4	6	*2	2	3.8	4.1	*6.7	6.9	*2.4	3.0	*2.6	3.2
Other diseases of intestine and peritoneum 560, 562–569	7	10	*26	39	9	11	5	7	6.1	6.3	*8.2	7.4	5.4	5.8	5.5	6.0
Gastroenteritis and colitis, except ulcerative, of noninfectious origin 561	10	4	79	34	14	7	3	1	5.9	5.5	7.4	6.6	4.8	4.8	3.9	3.1
Diseases of liver, gall bladder, and pancreas 570–577	*1	1	*	2	*	1	*	1	*8.3	10.4	*	22.1	*	10.4	*	8.3

Diseases of the genitourinary system	580–629	34	37	55	73	40	49	29	29	3.6	5.3	5.3	5.9	2.9	5.1	3.6	5.3
Complications of pregnancy, childbirth, and the puerperium	630–678	4	2	...	...	...	...	6	3	2.9	4.2	...	...	...	...	2.9	4.2
Diseases of the skin and subcutaneous tissue	680–709	13	22	37	88	16	29	9	14	4.5	6.6	6.8	8.3	4.2	6.5	3.9	5.6
Diseases of the musculoskeletal system and connective tissue	710–738	14	16	*18	9	10	12	15	19	6.3	8.5	*9.0	12.2	5.0	7.6	6.2	8.5
Congenital anomalies	740–759	30	44	166	216	41	51	14	26	5.9	8.8	7.7	13.4	5.0	7.7	4.8	6.0
Certain causes of perinatal morbidity and mortality	760–779	9	4	131	66	*1	(1)	*	-	9.6	15.1	9.6	15.1	*8.2	8.7	*	-
Symptoms and ill-defined conditions	780–796	20	65	57	216	22	83	16	45	3.5	4.4	4.7	5.7	3.1	4.4	3.2	3.9
Accidents, poisonings, and violence	800–999	95	115	114	110	98	131	92	110	4.8	5.0	6.4	5.4	4.5	4.9	4.7	5.1
Fracture of skull and face bones	800–804	5	7	*	24	5	7	4	5	4.0	4.6	*	3.8	2.9	4.8	4.3	4.8
Fracture of upper limb	810–819	15	17	*	2	7	8	18	22	3.2	2.8	*	5.3	4.9	3.4	2.9	2.7
Fracture of lower limb	820–829	11	11	*	5	*6	8	12	13	9.9	13.0	*	13.7	*13.5	16.5	9.3	12.2
Sprains and strains of joints and adjacent muscles	840–848	2	2	*	(1)	*	1	*2	2	4.2	3.7	*	9.1	*	3.1	*4.1	3.5
Intracranial injury (excluding those with skull fracture)	850–854	20	24	*19	25	21	24	19	24	3.3	2.6	*3.2	2.9	2.8	2.5	3.4	2.6
Lacerations	870–907	9	10	*	3	11	12	8	10	4.0	4.2	*	3.1	3.5	3.7	4.2	4.5
Other injury	910–939	5	11	*	12	*8	13	3	10	3.5	3.3	*	3.2	*2.3	3.0	3.3	3.4
Burns	940–949	6	6	*	10	11	13	3	3	10.2	12.8	*	10.7	10.3	12.0	10.6	14.5
Adverse effect of medicinal agents	960–979	4	8	*	5	10	20	*2	4	2.2	2.5	*	3.6	1.8	1.7	*2.6	3.9
Toxic effect of substances chiefly nonmedicinal as to source	980–995	4	6	*	9	9	15	*2	2	3.3	3.0	*	4.5	3.2	2.8	*3.5	3.2
Other complications of surgical and medical care	997–999	3	6	*	11	*	7	*3	5	5.5	6.8	*	9.3	*	6.9	*4.6	6.2

[1] Quantity more than 0 but less than 0.5.

Table 2. Discharge rate and average length of stay for male patients under 15 years of age discharged from short-stay hospitals, by age and selected diagnostic categories: United States and Canada, 1978

[For the United States, data are for first-listed diagnoses in non-Federal hospitals. For Canada, data are for principal or primary diagnosis in all short-stay hospitals. Data from both countries exclude newborn infants and are coded using the *Eighth Revision International Classification of Diseases, Adapted for Use in the United States* (ICDA–8)]

Diagnostic category and ICDA–8 code	Under 15 years		Under 1 year		1–4 years		5–14 years		Under 15 years		Under 1 year		1–4 years		5–14 years	
	United States	Canada	United States	Canada	United States	Canada	United States	Canada	United States	Canada	United States	Canada	United States	Canada	United States	Canada
	Rate per 10,000 population								Average length of stay in days							
All conditions	728	1,061	2,292	3,464	945	1,545	509	675	4.5	5.3	5.7	7.4	4.0	4.7	4.3	4.7
Infective and parasitic diseases 001–136	60	100	327	636	76	158	29	32	3.9	5.8	4.5	6.8	3.9	5.2	3.2	4.9
Diarrheal diseases 009	28	62	138	450	41	103	13	13	3.4	5.4	4.2	6.4	3.3	4.8	2.9	4.2
Neoplasms 140–239	12	12	*39	13	*10	13	11	11	6.4	8.5	*6.0	10.4	*13.6	8.7	7.4	8.2
Endocrine, nutritional and metabolic diseases 240–279	13	18	*53	129	*15	14	8	10	7.0	8.7	*6.8	8.7	*8.5	9.7	6.3	8.3
Diseases of the blood and blood-forming organs 280–289	14	14	*29	28	*14	15	12	13	4.2	5.3	*4.4	9.0	*5.5	6.2	3.7	4.2
Mental disorders 290–319	8	9	*	11	*	6	9	10	15.6	17.9	*	9.4	*	9.9	18.9	20.6
Diseases of the nervous system and sense organs 320–389	65	74	133	175	106	116	45	50	3.3	4.7	5.6	7.6	3.4	4.4	2.7	4.0
Otitis media without mention of mastoiditis 381	34	38	66	112	62	67	22	21	2.0	3.7	3.2	6.1	2.0	3.9	1.8	2.4
Diseases of the circulatory system 390–458	9	5	56	13	*	4	5	4	12.9	8.5	4.3	10.3	*	7.6	8.6	8.3
Diseases of the respiratory system 460–519	225	397	722	1,321	379	720	126	200	3.7	4.4	5.0	7.0	3.8	4.2	3.0	3.0
Upper respiratory infections, except influenza 460–465	32	89	133	431	73	195	9	21	3.5	4.3	3.8	5.4	3.4	3.9	3.2	3.2
Acute bronchitis and bronchiolitis 466	24	38	188	313	40	60	*4	5	4.3	3.7	4.7	7.0	3.9	5.2	*4.3	4.1
Influenza 470–474	4	6	*	24	*8	8	*3	4	3.5	4.4	*	6.2	*3.4	4.4	*3.6	3.6
Pneumonia, all forms 480–486	54	55	247	276	101	106	20	17	5.8	7.5	5.9	9.2	5.9	7.2	5.4	6.0
Bronchitis, chronic and unqualified 490–491	15	33	67	180	30	66	*5	8	3.8	6.1	4.4	7.3	3.5	5.4	*3.6	6.2
Asthma 493	14	36	*	39	25	72	9	24	4.0	4.3	*	7.8	3.8	4.2	3.7	3.9
Hypertrophy of tonsils and adenoids 500	70	122	*	5	87	184	70	110	1.9	1.8	*	3.1	1.7	1.8	2.0	1.9
Diseases of the digestive system 520–577	82	87	309	281	93	93	57	67	3.8	4.4	4.1	5.3	3.2	3.7	4.0	4.4
Diseases of the oral cavity, salivary glands, and jaws 520–529	7	11	*	9	*15	16	*4	10	2.4	2.7	*	5.9	*2.4	3.2	*2.4	2.2
Diseases of esophagus, stomach, and duodenum 530–537	7	8	*42	41	*	8	*5	5	4.6	4.9	*5.9	6.8	*	3.9	*3.1	4.0
Appendicitis 540–543	16	21	*	1	*	3	22	29	5.0	5.7	*	13.8	*	9.0	4.9	5.5
Inguinal hernia 550, 552	27	27	132	131	39	40	13	12	2.3	3.0	2.4	3.5	2.0	2.6	2.4	2.9
Other hernia of abdominal cavity 551, 553	*3	4	*	17	*	6	*	2	*3.1	4.4	*	6.9	*	3.3	*	3.3
Other diseases of the intestine and peritoneum 560, 562–569	9	11	*32	45	*10	13	7	7	5.7	6.2	*7.1	6.9	*4.2	5.7	5.7	6.0
Gastroenteritis and colitis, except ulcerative, of noninfectious origin 561	11	5	76	35	*16	7	*3	1	4.9	5.5	5.0	6.5	*5.2	5.0	*4.0	3.1
Diseases of the liver, gallbladder, and pancreas 570–577	*	1	*	2	*	1	*	1	*	10.7	*	24.6	*	7.8	*	8.8

Diseases of the genitourinary system	580–629	32	40	*51	99	38	58	28	29	3.3	4.6	*4.2	4.8	2.2	4.1	3.7	4.9
Complications of pregnancy, childbirth, and the puerperium	630–678																
Diseases of the skin and subcutaneous tissue	680–709	13	23	*42	89	*14	30	10	15	4.8	6.4	*6.8	8.2	*4.8	6.3	4.0	5.4
Diseases of the musculoskeletal system and connective tissue	710–738	13	17	*	9	11	13	13	19	6.8	8.6	*	11.6	5.3	7.4	7.2	8.8
Congenital anomalies	740–759	36	53	191	243	44	63	18	33	5.8	8.4	7.7	13.4	4.5	7.6	5.1	5.7
Certain causes of perinatal morbidity and mortality	760–779	9	4	140	76	*1	†	*	-	9.6	14.7	9.7	14.7	*9.0	10.5	*	-
Symptoms and ill-defined conditions	780–796	21	67	*52	223	25	90	17	45	3.5	4.4	*3.9	5.5	3.2	4.3	3.5	4.0
Accidents, poisonings, and violence	800–999	117	140	117	119	109	151	120	137	4.7	5.2	6.2	5.3	4.2	5.1	4.7	5.2
Francture of skull and face bones	800–804	6	8	*	27	*	8	*5	7	4.6	4.8	*	3.7	*	5.1	4.7	*5.0
Fracture of upper limb	810–819	18	21	*	2	*	9	23	27	2.9	2.8	*	5.6	*	3.4	2.7	2.7
Fracture of lower limb	820–829	14	15	*	4	*	11	17	17	9.5	13.3	*	14.3	*	16.8	9.1	12.5
Sprains and strains of joints and adjacent muscles	840–848	*2	2	*	†	*	1	*	3	*4.0	3.5	*	5.3	*	3.1	*	3.6
Intracranial injury (excluding those with skull fracture)	850–854	27	30	*	26	25	27	28	32	3.2	2.7	*	3.0	3.1	2.8	3.2	2.6
Lacerations	870–907	12	13	*	4	*15	14	11	14	4.1	4.4	*	3.4	*3.4	3.7	4.5	4.6
Other injury	910–939	5	14	*	13	*8	15	*4	14	3.1	3.4	*	3.6	*2.7	3.2	*3.6	3.5
Burns	940–949	7	8	*	13	*10	15	*5	5	9.3	13.1	*	10.6	*8.7	11.8	*10.4	15.1
Adverse effect of medicinal agents	960–979	4	7	*	5	*11	22	*	2	2.0	2.2	*	3.4	*1.8	1.7	*	3.7
Toxic effect of substances chiefly nonmedicinal as to source	980–995	5	7	*	8	*10	18	*3	3	3.2	3.0	*	3.5	*3.1	2.7	*3.4	3.5
Other complications of surgical and medical care	997–999	4	6	*	14	*	8	*	5	6.0	8.7	*	7.8	*	8.7	*	6.5

†Quantity more than 0 but less than 0.5.

Table 3. Discharge rate and average length of stay for female patients under 15 years of age discharged from short-stay hospitals, by age and selected diagnostic categories: United States and Canada, 1978

[For the United States, data are for first-listed diagnoses in non-Federal hospitals. For Canada, data are for principal or primary diagnosis in all short-stay hospitals. Data from both countries exclude newborn infants and are coded using the *Eighth Revision International Classification of Diseases, Adapted for Use in the United States* (ICDA–8)]

Diagnostic category and ICDA–8 code	Under 15 years		Under 1 year		1–4 years		5–14 years		Under 15 years		Under 1 year		1–4 years		5–14 years	
	United States	Canada	United States	Canada	United States	Canada	United States	Canada	United States	Canada	United States	Canada	United States	Canada	United States	Canada
	Rates per 10,000 population								Average length of stay in days							
All conditions	601	839	1,797	2,646	727	1,128	449	576	4.4	5.3	6.3	7.7	4.0	5.0	3.9	4.6
Infective and parasitic diseases 001–136	55	87	288	560	75	132	27	28	4.0	5.8	4.8	6.8	4.0	5.4	3.3	4.6
Diarrheal disease 009	25	52	138	391	38	83	10	11	3.8	5.3	4.7	6.3	3.7	4.8	2.7	3.2
Neoplasms 140–239	13	11	*35	19	*13	13	11	10	7.0	8.5	*10.0	9.9	*7.8	8.7	5.9	8.2
Endocrine, nutritional and metabolic diseases 240–279	11	18	*46	126	*9	12	8	10	7.1	9.0	*6.0	8.6	*9.9	9.8	6.5	9.0
Diseases of the blood and blood-forming organs 280–289	12	12	*	24	*	11	13	12	6.1	5.5	*	9.6	*	6.7	5.8	4.4
Mental disorders 290–319	9	8	*	9	*	5	11	9	11.9	17.1	*	7.9	*	30.8	12.4	15.4
Diseases of the nervous system and sense organs 320–389	52	60	103	145	89	91	35	42	3.2	4.9	5.6	7.4	2.9	4.4	2.7	4.5
Otitis media without mention of mastoiditis 381	25	29	*52	85	50	48	15	17	2.1	3.8	*3.3	5.9	2.1	4.0	1.6	2.5
Diseases of the circulatory system 390–458	7	4	*38	13	*	3	*5	3	7.4	9.0	*8.3	10.0	*	8.1	*8.2	8.9
Diseases of the respiratory system 460–519	194	318	511	916	270	508	139	198	3.4	4.1	4.9	6.9	3.7	4.3	2.8	2.9
Upper respiratory infections, except influenza 460–465	27	65	112	331	51	132	12	18	4.0	4.4	3.9	5.4	3.7	4.2	4.5	3.5
Acute bronchitis and bronchiolitis 466	16	25	130	198	27	41	*2	4	4.5	6.1	4.9	6.9	3.9	5.4	*4.6	4.7
Influenza 470–474	4	5	*	18	*	8	*3	4	3.2	4.3	*	6.0	*	4.2	*3.3	3.5
Pneumonia, all forms 480–486	40	44	169	203	78	85	16	15	5.1	7.3	5.5	9.1	4.9	7.0	5.2	6.3
Bronchitis, chronic and unqualified 490–491	10	22	*43	108	19	42	*4	7	4.3	6.2	*5.6	7.3	3.5	5.5	*4.2	4.8
Asthma 493	10	23	*	17	18	43	7	17	3.7	4.4	*	7.0	3.7	4.4	3.7	4.3
Hypertrophy of tonsils and adenoids 500	76	122	*	4	60	140	89	126	1.9	1.9	*	3.4	1.9	1.9	1.9	1.9
Diseases of the digestive system 520–577	54	57	208	140	46	54	42	51	4.8	4.7	7.2	6.7	4.0	4.1	4.1	4.5
Diseases of oral cavity, salivary glands, and jaws 520–529	6	12	*	8	*	16	*6	11	2.1	2.6	*	4.5	*	3.3	*2.1	2.1
Diseases of esophagus, stomach, and duodenum 530–537	6	7	*32	28	*	7	*4	5	4.4	4.8	*4.6	7.5	*	3.6	*4.3	4.0
Appendicitis 540–543	15	17	-	1	*	2	20	24	5.0	5.6	-	15.8	*	8.7	4.8	5.5
Inguinal hernia 550, 552	7	5	*46	24	*	7	*3	3	1.9	2.7	*1.7	3.0	*	2.4	*2.3	2.6
Other hernia of abdominal cavity 551, 553	4	3	*	13	*	7	*	1	4.5	3.8	*	6.9	*	2.7	*	3.1
Other diseases of intestine and peritoneum 560, 562–569	5	8	*	33	*	9	*3	6	6.8	6.6	*	8.2	*	6.0	*5.0	6.0
Gastroenteritis and colitis, except ulcerative, of noninfectious origin 561	10	4	83	32	*12	6	*3	1	7.0	5.5	9.7	6.7	*4.4	4.5	*3.7	3.2
Diseases of liver, gallbladder, and pancreas 570–577	*	1	*	2	*	1	*	1	*	10.1	*	19.7	*	13.9	*	8.1

Diseases of the genitourinary system	580–629	35	33	*60	46	42	39	31	29	3.9	6.1	*6.3	8.3	3.6	6.5	3.5	5.6
Complications of pregnancy, childbirth, and the puerperium	630–678	8	4	...	...	...	...	12	6	2.9	4.2	...	...	...	...	2.9	4.2
Diseases of the skin and subcutaneous tissue	680–709	13	21	*31	86	17	28	9	13	4.2	6.8	*6.9	8.5	3.7	6.8	3.7	5.8
Diseases of the musculoskeletal system and connective tissue	710–738	15	16	*	9	*9	10	17	19	5.8	8.4	*	12.8	*4.6	7.9	5.5	8.3
Congenital anomalies	740–759	25	34	140	187	37	38	10	19	6.0	9.3	7.6	13.5	5.6	8.0	4.4	6.5
Certain causes of perinatal morbidity and mortality	760–779	8	4	122	57	*1	(1)	-	-	9.5	15.7	9.6	15.8	*7.0	7.1	-	-
Symptoms and ill-defined conditions	780–796	18	63	62	209	19	75	14	46	3.5	4.5	5.5	5.9	2.9	4.5	2.9	3.9
Accidents, poisonings, and violence	800–999	72	89	110	100	87	110	64	80	4.9	4.8	6.7	5.6	5.0	4.5	4.5	4.9
Fracture of skull and face bones	800–804	4	5	*	21	*	5	*3	4	3.1	4.3	*	3.9	*	4.3	*3.5	4.4
Fracture of upper limb	810–819	12	13	*	2	*	7	14	16	3.6	2.8	*	4.9	*	3.4	3.2	2.6
Fracture of lower limb	820–829	7	8	*	5	*	5	7	9	10.7	12.4	*	13.1	*	15.9	9.8	11.7
Sprains and strains of joints and adjacent muscles	840–848	*	1	*	1	-	(1)	*	2	*	3.9	*	12.4	-	3.1	*	3.4
Intracranial injury (excluding those with skull fracture)	850–854	13	18	*	24	17	21	11	17	3.3	2.5	*	2.7	2.3	2.1	4.1	2.7
Lacerations	870–907	6	7	*	2	*	10	*6	7	3.7	3.9	*	2.7	*	3.7	*3.5	4.1
Other injury	910–939	4	8	*	11	*	11	*	7	3.9	3.0	*	2.8	*	2.7	*	3.2
Burns	940–949	5	5	*	8	*12	10	*	2	11.6	12.5	*	10.9	*11.6	12.4	*	13.0
Adverse effect of medicinal agents	960–979	5	8	*	5	*9	18	*3	5	2.3	2.8	*	3.8	*1.8	1.7	*2.6	4.1
Toxic effect of substances chiefly nonmedicinal as to source	980–995	*3	5	*	9	*	12	*	2	*3.5	3.2	*	5.5	*	2.9	*	2.7
Other complications of surgical and medical care	997–999	*3	5	*	9	*	6	*	4	*4.7	6.9	*	11.8	*	7.2	*	6.0

[1] Quantity more than 0 but less than 0.5.

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Appendix I
Sources of Data

Table I. Hospital discharge data systems

Characteristic	*United States*	*Canada*
Data system	National Hospital Discharge Survey, conducted by the National Center for Health Statistics (NCHS).	National hospital morbidity statistics, compiled by Statistics Canada.
Background	In 1962–63, NCHS developed the Master Facility Inventory (MFI), a comprehensive list of hospitals, nursing homes, and other inpatient facilities in the United States. In 1964 a sample of 95 hospitals was drawn from the MFI for a pilot study of hospital discharges. A master sample of 690 hospitals was drawn from the MFI in 1965, 350 of which were inducted into the National Hospital Discharge Survey. An additional 150 hospitals from the master sample were added to the survey during the first years of operation. In 1972 and every 2 or 3 years since, the master sample has been supplemented by a "birth sample" drawn from lists of new hospitals added to the MFI since 1965. In 1978 there were 535 hospitals in the survey sample, 413 of which participated in the survey.	One of the requirements of the national hospital insurance program, which began operation in 1958–61, was that each Province collect information on its discharges so that patient eligibility could be checked and per diem payments to the hospitals could be determined. The Royal Commission on Health Services, which was serving while the insurance program was beginning, recommended that Statistics Canada obtain hospital morbidity records from the Provinces and compile national morbidity statistics. The Provinces all developed discharge reporting systems, and national morbidity data were first compiled in 1960.
Methods of data collection	A two-stage stratified sampling design is used in the survey. The first stage is selection of a sample of hospitals. The primary stratification variables are bed size and geographic region. Hospitals are selected in direct proportion to size. Hospitals with 1,000 beds or more have a sampling probability of certainty, and the sampling probability decreases to 1 in 40 for hospitals with less than 50 beds. The second stage is a systematic sample of discharges from the sampled hospitals. The discharges are selected in inverse proportion to hospital size. In hospitals with 1,000 or more beds, the sampling probability is 1 in 100, in hospitals with less than 50 beds, it is 4 in 10. The sampling frame in nearly all hospitals is the daily listing of discharges. A random sampling technique is used, usually based on the terminal digit of the patient's medical record number. An abstract is completed on each sample discharge using the information available on the face	The hospital morbidity statistics are not based on a sample survey but a complete count of inpatient cases. An admission/discharge form is filled out for each patient discharged. The staff members of the individual hospitals complete the forms, but the coding of diagnoses and surgical procedures is usually done by Provincial authorities. Hospitals send the forms to Provincial hospital insurance commissions, which tabulate data for their own purposes and prepare a computer tape of data, which is sent to Statistics Canada. At Statistics Canada the data tapes are converted to a standard format, edited for errors and missing data, and processed.

NOTE: A list of references follows the text.

Table I. Hospital discharge data systems—Con.

Characteristic	*United States*	*Canada*
	sheet of the patient's medical record. In about two-thirds of the hospitals, the abstracting is done by the medical records department of the hospital. In the remainder the work is done by the U.S. Bureau of the Census acting for NCHS. The NCHS staff code all abstract information, including diagnoses and surgical procedures. The data are subsequently transferred to computer tapes, edited, and processed.	
Coverage	The survey covers hospitals in the 50 States and the District of Columbia for which the average length of stay is less than 30 days, with the following exceptions: institutional hospitals, such as prison hospitals and university student health centers; Federal hospitals, such as military and Veterans Administration hospitals; and hospitals with fewer than 6 beds. Within covered hospitals, the sample of discharges sometimes excludes patients in long-term care units, if the units keep records separately from the rest of the hospital. Discharges of newborn infants are sampled but are excluded from the published totals.	The statistics are collected from all general and allied special hospitals in the Provinces. Allied special hospitals include rehabilitation, convalescence, extended care, and chronic hospitals. In 1978, psychiatric hospitals were not covered, though they may be included in future years. The Canadian Territories, Yukon and the Northwest Territories, are not covered. In some Provinces, data on patients whose hospitalizations are not paid for by the health insurance program are not reported. Approximately 99 percent of the Canadian population is covered by the hospital insurance program, but some hospitalizations of insured patients may be the responsibility of alternative programs, such as Workmen's Compensation. Data on newborn infants are collected but are excluded from the published totals.
Items collected	Items include personal characteristics of patients, such as date of birth, sex, race, marital status, and residence (zip code); administrative information, such as admission and discharge dates, discharge status, medical record number, and expected principal source of payment; and medical information, up to five diagnoses and three surgical procedures in 1978, and dates of surgical procedures.	The items on the admission/discharge forms vary from Province to Province. A core of information is collected in all Provinces, but some differences exist in the definitions and classifications used for common items. The standard record prepared by Statistics Canada on each discharge includes age, sex, principal or primary diagnosis, primary surgical procedure, length of stay, and identification of the hospital.
Coding	The *Eighth Revision International Classification of Diseases, Adapted for Use in the United States*[39] (ICDA–8) was the basic system used for coding diagnoses and surgical procedures. However, some modifications have been made in the ICDA–8 for the survey. A complete list of the modifications has been published.[45,46] Most important for this study are the exclusion of maternal conditions and conditions of the placenta and umbilical cord (760–771), except for birth injuries with mention of cause, which are coded as birth injury (772), and exclusion of some operations inducing or assisting delivery (75.0–75.6, 75.9).	The *Eighth Revision International Classification of Diseases, Adapted for Use in the United States*[39] (ICDA–8) was used for coding diagnoses and surgical procedures, except in Alberta, which used the hospital adaptation of the International Classification of Diseases,[47] second edition, which cannot be perfectly translated into ICDA–8 at all levels of detail. The conditions and procedures excluded from the coding list in the United States were included for Canada, but in this study, the data on the operations inducing or assisting delivery (75.0–75.6, 75.9) were excluded from the surgical statistics.

NOTE: A list of references follows the text.

Table I. Hospital discharge data systems—Con.

Characteristic	*United States*	*Canada*
Missing data procedures	Missing data on age or sex are imputed by assigning an age or sex to the patient consistent with other patients who have the same diagnostic code. In the rare instance when date of admission or discharge cannot be obtained, length of stay is imputed by assigning a length of stay characteristic of other patients of the same age.	Missing data on age or sex are imputed according to a predetermined mathematical model that assigns an age or sex consistent with the patient's diagnosis and surgical procedure.
Other procedures	A complex estimating procedure is used to obtain essentially unbiased national estimates from the sample data. The procedure has three principal components: inflation by reciprocals of the probabilities of sample selection, adjustment for nonresponse, and ratio adjustment to fixed totals. Detailed descriptions of the estimating procedure,[48,49] and discussions of sampling errors,[45,46] have been published.	To obtain data for this study on short-stay hospital discharges, the computer files of hospital morbidity statistics were merged with files that contained the average length of stay of each Canadian hospital. The discharge records from hospitals in which the average length of stay was less than 30 days were identified using the hospital number on each record, and data from these records were tabulated separately.
Release of data	Annual reports of data from the survey are published in NCHS's *Vital and Health Statistics* Series 13. These reports update summary nonmedical, medical, and surgical data for characteristics of patients and hospitals. Special reports are also published in the series on selected topics such as average length of stay, patient charges, and geographical utilization. Unpublished data from the survey are available on request from the NCHS Division of Health Care Statistics, and data for 1970 and subsequent years are available on public use tapes.	Data are published in annual reports, *Hospital Morbidity,* and *Surgical Procedures and Treatments,* which present number of discharges, discharge rates, and average length of stay by age and sex and by sex and Province, in the former report, for each three-digit diagnostic category, in the latter report for each three-digit surgical code. Unpublished data are available from the Institutional Care Statistics Section, Health Division, Statistics Canada.

NOTE: A list of references follows the text.

Table II. Mortality data systems

Characteristic	*United States*	*Canada*
Data system	National vital statistics system, managed by the National Center for Health Statistics (NCHS).	National vital statistics system, managed by Statistics Canada.
Methods of data collection	Births, deaths, fetal deaths, induced terminations of pregnancy, marriages, divorces, and dissolutions of marriages are registered by State and local authorities. Deaths are generally reported to a local registrar who sends the records to a State health department. The State officials transmit microfilm copies of the records or machine-readable data to NCHS. In 1978 all data from death registrations were coded at the State level in 7 States. These States provided NCHS with data on computer tapes. In 29 States demographic data were coded at the State level and submitted to NCHS on computer tape, but copies of the death certificates were also forwarded, and NCHS coded cause of death. For the remainder of the States, NCHS received copies of the death certificates and coded all data.	Under Federal-Provincial agreements, the Provinces and Territories are required to register births, stillbirths, marriages, and deaths, and to collect uniform items of information about these events. Microfilm copies of the registrations are sent to Statistics Canada. Six Provinces also provide Statistics Canada with machine-readable abstracts of the registrations. Statistics Canada converts the registrations from the four Atlantic Provinces and the Territories to machine-readable form. The cause of death is coded by trained medical coders, usually in Provincial offices, but for Newfoundland and the Territories the coding is done at Statistics Canada.
Completeness	Every State has a law requiring registration of all deaths, and almost all deaths are registered, but there is evidence that registration is incomplete in certain isolated areas.	Almost all deaths are thought to be registered, though no recent studies have been done on the coverage of the system. A very small proportion of deaths are not included in the national statistics because they are reported after the cutoff date.
Items collected	A standard death certificate, developed and periodically revised by NCHS in cooperation with State and local authorities, is recommended for use in all States. Because of variations in laws and practices, not all States use the standard certificate, but most follow it closely. The standard certificate recommended for use beginning January 1, 1978, included the following items: • *Sociodemographic*—sex, date of birth and death, age, marital status, race, occupation, citizenship, whether ever in the armed services, and social security number. • *Geographic*—place of death (county, city or other location, and hospital), place of injury, residence of deceased, place of birth, and address of parents. • *Mortality*—underlying cause, immediate cause, other significant conditions, autopsy, disposition, and details about injuries.	Data items collected on all deaths include the following: • *Sociodemographic*—sex, date of birth and death, age, marital status, ethnic origin, and occupation. • *Geographic*—place of death (Province, area, and hospital), place of injury, residence of deceased, place of birth, and birthplace of parents. • *Mortality*—underlying cause, designation of medical attendant, autopsy, and disposition.
Coding system	In 1978 the *Eighth Revision International Classification of Diseases, Adapted for Use in the United States*[39] was used to code cause of death.	In 1978 the *Eighth Revision International Classification of Diseases, Adapted for Use in the United States*[39] was used to code cause of death.
Release of data	Mortality data are published by NCHS in the *Monthly Vital Statistics Report*, the annual *Vital*	Statistics Canada publishes *Vital Statistics*, Volume III, Mortality, Summary List of Causes

NOTE: A list of references follows the text.

Table II. Mortality data systems—Con.

Characteristic	United States	Canada
	Statistics of the United States, and special reports in *Vital and Health Statistics*, Series 20. Public use data tapes are made available annually, and some unpublished tabulations are available from the Division of Vital Statistics, NCHS.	and *Causes of Death* each year. Special reports, such as life tables and analytical studies, are also published. Unpublished tabulations and machine-readable data are available from the Vital Statistics and Disease Registries Section, Health Division, Statistics Canada.

Table III. National household interview surveys

Characteristic	*United States*	*Canada*
Survey	National Health Interview Survey conducted by the National Center for Health Statistics (NCHS).	Canada Health Survey, conducted by the Department of National Health and Welfare and Statistics Canada.
Background	The survey was begun in 1957 to obtain information on the amount, distribution, and effects of illness and disability in the United States and on the health services supplied for or because of such conditions. It is conducted continuously. Interviews take place each week throughout the year in a probability sample of households, and the data collected over a year form the basis for annual estimates of health and use of health services. The interview questionnaire is reviewed each year and supplementary topics are added or deleted periodically.	The survey was proposed in 1974 to obtain better data on health status, especially self-limited and self-treated conditions and their consequences. Pretests were conducted in 1976–77, and in May 1978 the survey began in the eastern Provinces. The central Provinces were added in June, and the entire survey population was covered in July 1978. While the survey was planned to operate continuously, a government-wide policy of expenditure restraint introduced in August 1978 resulted in a halt to data collection in March 1979.
Coverage	The survey covers the civilian noninstitutionalized population of the United States. Persons excluded are patients in long-term care facilities, members of the Armed Forces, U.S. nationals living in foreign countries, and persons who died during the survey reference period.	The survey covers the noninstitutionalized population of Canada, except for residents of the Territories, Indian Reserves, and certain remote areas defined by the Canadian Labor Force Survey. The excluded groups account for approximately 3 percent of the Canadian population.
Methods of data collection	Data are collected through personal household interviews conducted by part-time interviewers employed and trained by the U.S. Bureau of the Census. All members of the household 17 years of age and over who are home at the time of the interview are invited to participate and respond for themselves. The mother is usually the respondent for children, and information is obtained from an adult family member 19 years of age or over for persons not at home during the interview. Between 65 and 70 percent of persons 17 years of age and over are self-respondents. Sometimes a random subsample of adult household members is selected to respond to questions on special topics. Followup questionnaires, for the entire household or for persons with particular health problems, are also used at times. As required, these questionnaires are returned by mail or the interviewer calls again to obtain the information directly. The interviews average about 45 minutes but, depending on family size and the extent of health conditions, can range from 15 to 90 minutes. Each year data are collected from approximately 40,000 households on about 110,000 persons. The annual response rate is usually at least 95 percent of the eligible households.	The survey had two components, an interview component and a physical measures component. Interview data were collected by part-time interviewers employed by Statistics Canada. A member of the household provided information about characteristics of the dwelling, the persons who resided there, and the health status and use of health services of all persons in the household. Questionnaires on lifestyle and emotional health were left behind to be completed by each household member 15 years of age and over. The interviewer returned a few days later to pick up these questionnaires. In approximately one-third of the households, physical measures data were collected by part-time nurses employed by the Victorian Order of Nurses under contract to the Department of National Health and Welfare. The initial interviewer and nurse worked as a team in these households, the interviewer scheduling an appointment to return with the nurse to collect the questionnaires and conduct the physical measures. The nurse obtained measures of blood pressure, cardiorespiratory fitness, and percent body fat on household members 2 years of age and over and blood samples from persons 3 years of age and over. The sample size for the 9 months that the survey was conducted in all Provinces was 12,218 households, 86 percent of which participated. A total of 31,668 persons were reported on in the initial interviews, 23,791 completed the followup

Table III. National household interview surveys—Con.

Characteristic	*United States*	*Canada*
		questionnaire, the physical measures were taken on 6,131 persons, and blood samples were obtained from 4,829 persons.
Sample design	The sampling plan follows a multistage probability design. The first stage consists of a sample of 376 primary sampling units drawn from approximately 1,900 geographically defined primary sampling units that cover the 50 States and the District of Columbia. A primary sampling unit may be a county, a small group of contiguous counties, or a standard metropolitan statistical area. Within the primary sampling units, smaller units called segments are defined in such a manner that each segment contains an expected four households. The sampling plan is designed so that national estimates and estimates for four geographical regions can be obtained.	The survey followed a stratified multistage clustered sample design. Initial stratification was by Province, with Quebec and Ontario each divided into three further strata. The initial strata were stratified into three additional strata, the first containing major cities, the second other major urban parts, and the third the remaining, mainly rural, parts of the region. To minimize data collection costs, the desired annual sample of 12,000 households was divided into 100 geographic clusters, and plans called for 10 households from each cluster to be sampled each month. The 100 clusters were initially allocated to the Provinces proportional to the square root of the Provincial population and to the urban-rural strata proportional to their respective populations, with the requirement that the minimum allocation to a stratum be 2. The sampling plan was designed to allow both national and Provincial estimates to be obtained. When the plan to conduct the survey on an ongoing basis was changed, adjustments were made in the number of households selected per cluster so that a sample size close to 12,000 households could be reached before data collected was terminated.
Items collected	Information collected each year includes the following: Basic demographic and social characteristics of household members, disability days, physician and dental visits, acute and chronic conditions responsible for the disability days and physician visits, long-term limitation of activity from chronic disease or impairment and the chronic conditions associated with the limitation, short-stay hospital use data, the interval since the last physician and dental visit, and questions about 6 lists of chronic conditions, each list involving a specific system of the body (for example, digestive and circulatory). Supplements to the questionnaire change periodically. In 1978, the topics covered in supplements were usual source of care, health insurance coverage, blood donation, immunization, smoking, and military service.	The initial interviews obtained information about the following: household characteristics, social and economic characteristics, mobility, immigration, disability days, activity limitation, short-term conditions, accidents and injuries, chronic conditions, impairments, hearing, vision and dental status, use of professional health services, the professional providing services, location of services received, reasons services not sought, drug use, and use of medical devices. The self-administered questionnaires sought information about social characteristics, family disease history, alcohol use, alcohol-related problems, tobacco use, physical activities, seatbelt use, female preventive behaviors (for example, breast examinations and pap smear), and psychological well-being. The physical measures included height, weight, arm measurement, skinfold, blood pressure, and a cardiovascular fitness exercise. Blood was tested for immune status, cholesterol, glucose, uric acid, anemia, liver function, kidney function, lead, cadmium, copper, and zinc.

Table III. National household interview surveys—Con.

Characteristic	United States	Canada
Data processing	Data on illnesses, diseases, and injuries are centrally coded by NCHS. A modified version of the *Eighth Revision International Classification of Diseases, Adapted for Use in the United States*[38] was used for coding 1978 data. Data are adjusted for nonresponse by a procedure that imputes to persons in a household who are not interviewed the characteristics of persons who are interviewed. The national estimates are based on a multistage estimation procedure involving inflation by the reciprocal of the probability of selection, an adjustment for household nonresponse, ratio adjustment, and poststratification.	Data on health conditions were coded by a central unit of Statistics Canada according to the ninth revision of the International Classification of Diseases.[50] All nonresponse and inconsistent data that could not be resolved during editing was coded "unknown." In general, no imputation was performed on the survey data to replace the unknowns. The national estimates were based on a multistage estimating procedure involving assignment of weights to households. These weights were the reciprocal of the probability of selection. Adjustments were made for household, form, and person unknown values, and for undersampling or oversampling within Province-age-sex groups. Estimates of annual disability days (including bed days, major activity-loss days, and reduced activity days) were adjusted for seasonal variation based on the seasonal trends shown in the 1978 data from the U.S. National Health Interview Survey.
Release of data	Data from the survey are published in *Vital and Health Statistics*, Series 10. Summary statistics are published in annual reports titled "Current Estimates," which are followed by reports containing additional data and analyses. Many unpublished tabulations are routinely generated and are available from the NCHS Division of Health Interview Statistics. Public use data tapes of survey data also are available.	Basic tabulations from the survey were published in *The Health of Canadians*.[33] Further analyses can be conducted on request to the Research and Analysis Section, Health Division, Statistics Canada.

NOTE: A list of references follows the text.

Table IV. Hospital facilities data systems

Characteristic	United States	Canada
Data system	Annual Survey of Hospitals, conducted by the American Hospital Association.	Annual Returns of Health Care Facilities, compiled by Statistics Canada.
Coverage	The survey covers all hospitals in the United States and the associated areas of American Samoa, Guam, the Marshall Islands, Puerto Rico, and the Virgin Islands, regardless of whether registered with the American Hospital Association; however, only data from registered hospitals in the 50 States and the District of Columbia were used in this report. Institutions with less than 6 beds are not defined as hospitals and are not covered by the survey.	All general and allied special hospitals are expected to complete the Annual Returns. Allied special hospitals include pediatric, maternity, orthopedic, neurological, rehabilitation, convalescence, extended care, chronic, and outpost hospitals; institutes of psychiatry; and nursing stations. Outpost hospitals and nursing stations are quite small; most have less than 6 beds. Mental hospitals complete the Annual Returns, but their data are tabulated and published separately from that of other hospitals.
Data collection and processing	The American Hospital Association mails questionnaires to hospitals each year. Hospital personnel are asked to provide information about a year period ending September 30. In 1978, 55 percent of the hospitals provided data for the year ending in September. Another 26 percent provided data for the year period ending June 1978, and the remainder provided data for year periods ending at a variety of other times, from December 1977 to December 1978. In 1978, 90 percent of the 7,015 U.S. hospitals registered with the American Hospital Association returned the questionnaires. The percent responding was lower for hospitals with less than 100 beds and lowest, 73 percent, for hospitals with less than 25 beds. Among the 215 nonregistered U.S. hospitals, 60 percent returned questionnaires in 1978. Estimates were made of data from nonreporting hospitals and missing data. The estimate of the number of beds for a nonresponding hospital was based on the most recent information available from the hospital. Estimates of revenues, expenses, admissions, inpatient days, outpatient visits, and personnel were based on data reported the previous year by the nonresponding hospital, if available. If not, imputations were made based on data from hospitals with similar characteristics. No estimates of facilities and services data for nonreporting hospitals were made by the American Hospital Association.	The Provincial health authorities distribute the Annual Returns to hospitals each year. Administrative personnel in the hospitals complete the Returns according to a standard, detailed set of instructions developed by Statistics Canada and the Department of National Health and Welfare. The hospitals send the completed Returns back to the Provincial authorities, who edit them and forward copies or computer data tapes to Statistics Canada. In 1977–78, the reporting period was converted from a calender year to a fiscal year ending March 31. The hospitals in 3 Provinces reported data for the fiscal year. All other hospitals reported data for a 15-month period ending in March, and the data were adjusted by Statistics Canada to reflect a 12-month period. A total of 1,252 general and allied special hospitals were operating in Canada in March 1978, 1,207 of which completed the Annual Returns. The reporting hospitals contained 99 percent of the beds in the operating hospitals. In general, no estimates were made of data for nonreporting hospitals or of missing data.
Items collected	The survey questionnaires are revised periodically. In 1978 the items collected included the following: • Hospital ownership and type of service • Availability of specific types of facilities and services; for example, postoperative recovery room, blood bank, respiratory therapy • Beds, discharges, and inpatient days by specific types of inpatient services; for example, pediatric, burn care, or psychiatric services	The present forms for the Annual Returns were adopted in 1976. The principal data items on the Returns include the following: • Hospital ownership, type of service, and total number of beds • Beds and inpatient days by types of inpatient units • Movement of patients (patients in hospital at beginning and end of reporting period, admissions,

Table IV. Hospital facilities data systems—Con.

Characteristic	*United States*	*Canada*
	• Total beds and utilization, including births, operations, outpatient visits, admissions, discharges, and inpatient days • Revenue, expenses, and restricted and unrestricted funds • Personnel on payroll at end of reporting period	discharges, deaths, and inpatient days) by type of inpatient unit • Types of diagnostic and therapeutic services, their staff and expenses, and workloads of laboratory and radiology • Types and number of visits to ambulatory care units • Activity of other hospital units, for example respiratory technology, obstetrical unit, and laundry • Hospital personnel • Educational programs • Income and expenditures
Release of data	A wide array of statistical data from the survey is published annually by the American Hospital Association in *Hospital Statistics*. A list of all hospitals by location with summary information on each hospital is also published annually, *American Hospital Association Guide to the Health Care Field*. Additional data are available from the Department of Data Services of the Hospital Data Center, American Hospital Association.	A wide array of statistical data from the Annual Returns is published by Statistics Canada in *Hospital Annual Statistics. List of Canadian Hospitals and Special Care Facilities*, which reports the name, address, ownership, type of service, and number of beds of each hospital is also published annually by Statistics Canada. Additional data are available from the Institutional Statistics Section, Health Division, Statistics Canada.

Table V. Physician data systems

Characteristic	*United States*	*Canada*
Data system	Physician Masterfile, maintained by the American Medical Association.	Physician Record File, maintained by the Medical Section, Circulation Department, Southam Business Publications. The Department of National Health and Welfare purchases a copy of the computer tape 4 times a year from Sales Management Systems, a division of Southam Business Publications.
Coverage	Files are maintained on almost all medical doctors in the United States and U.S. Possessions, both members and nonmembers of the American Medical Association. Graduates of U.S. medical schools temporarily practicing outside of the country and graduates of foreign medical schools who are in the United States and meet U.S. education standards for physicians are covered. Doctors of osteopathy, who account for about 4 percent of active physicians, are not included in the files, but the American Osteopathic Association collects information on them.	Files are maintained on almost all medical doctors in Canada, including graduates of foreign medical schools and Canadian doctors known to be outside of the country who may or may not return. Doctors of osteopathy, who account for approximately 0.1 percent of all active physicians are not included in the files, but the Canadian Osteopathic Association collects information on them.
Methods of data collection	A file is begun on each individual who enters a U.S. medical school and each graduate of a foreign medical school who enters the United States. Additional information is added to the files as the physician's training and career develop. Every 4 years a census is conducted to update the files. The response rate for the 1977 census was 85 percent. Between the censuses, the files are updated weekly as information is obtained on changes in physician activities. The sources of information include American Medical Association mailings or publications, address company mailings, physician correspondence, hospitals, Government agencies, medical societies, medical boards, and licensing agencies. A questionnaire may be sent to the physician to verify the changes in activities.	The minimum information kept on file about each physician is the physician's name. In some instances the name is obtained from a source that does not provide an address or other information. When additional data are obtained, a computer record of name, address, and coded data is produced on the physician. The files and records are updated weekly using sources of information such as Provincial registrars, hospitals, medical schools, specialty associations, Provincial medical associations, the Medical Council of Canada, Departments of Health, pharmaceutical companies, physician correspondence, telephone directories, newspapers, and journals. Data are also obtained from an annual questionnaire distributed to all physicians by the Canadian Medical Association. The response rate for the survey is about 35 percent. In addition, Southam Business Publications sends out questionnaires to doctors about whom insufficient information has been collected from other sources.
Items collected	Each file has two parts. One is historical information that changes infrequently, such as details about medical school training, internship and residency training, licensure, board certification, and professional affiliations. The second portion, which is subject to constant change, includes current address, professional activities (average hours spent in patient care and nonpatient care activities per week), specialization (average hours spent in primary, secondary, and tertiary specialties per week), and present employment (hours spent by type of employer, such as solo practice, group practice, and hospital).	Data coded for computer records in 1978 included the following: physician identification number; university or country of graduation and year of graduation; whether or not registered; Province, county and municipality of residence; type of physician (general practitioner, specialist, intern, or resident); up to 4 specialties in which certified; specialty in which, though not certified, the physician spends the majority of time; appointment (for example, medical school faculty, Government, or hospital); activity status (for example, active, abroad, or military); and hospital affiliation.

Table V. Physician data systems—Con.

Characteristic	*United States*	*Canada*
Release of data	Data from the Masterfile are published by the American Medical Association in the *Distribution of Physicians, Special Statistical,* and *Reference Data* series. Unpublished data can be obtained for research and other special purposes from the Department of Data Release Services, American Medical Association.	The Physician Record File is one of many such files maintained by Southam Business Publications and purchased by a variety of customers for mailing list purposes. The National Department of Health and Welfare publishes physician data from the file annually in *Canada Health Manpower Inventory.*

Appendix II
Definitions of selected terms

Table VI. Hospital use terms

Characteristic	*United States*	*Canada*
Hospital	A general or special hospital with an average length of stay of less than 30 days. Hospitals with fewer than 6 beds for inpatient use, Federal hospitals, and hospital units of institutions are not included.	A general or allied special hospital with an average length of stay of less than 30 days. Mental hospitals are not included. (See "newborn infant" for an exception to this definition.)
Discharge	The formal release of a patient by a hospital; that is the termination of a period of hospitalization by death or by disposition to place of residence, another hospital, nursing home, or other place.	Same as for the United States. "Discharge" is used in this report rather than the Canadian term for deaths and other dispositions, "separation."
Discharge rate	The ratio of the number of hospital discharges during 1978 to the number of persons in the population. The estimate of the civilian population on July 1, 1978, as revised after the 1980 Census, was used to compute discharge rates.	Same as for the United States, except that the estimate of the resident population on June 1, 1978, as revised after the 1981 Census, was used to compute discharge rates.
Average length of stay	The total number of patient days accumulated at the time of discharge by patients discharged during 1978, counting the day of admission but not the date of discharge, divided by the number of discharges.	Same as for the United States.
Diagnosis	The diagnosis identified as principal diagnosis or listed first on the face sheet of the medical record. The number of diagnoses is equivalent to the number of discharges.	In some Provinces, the diagnosis identified as the condition that required the most medical resources, and in other Provinces, the diagnosis identified as the condition that precipitated admission to the hospital. The number of diagnoses is equivalent to the number of discharges.
Surgical procedure	The surgical procedure listed first on the face sheet of the medical record.	The primary operation, defined as the main or most important surgical procedure during one period of hospitalization.
Surgical discharge	A patient who underwent at least one surgical procedure during hospitalization. In this report, the number of surgical discharges is equivalent to the number of surgical procedures.	Same as for the United States.
Newborn infant	An infant admitted by birth to a short-stay non-Federal hospital.	An infant admitted by birth to a hospital or admitted with mother for maternal care. Such infants in all general and allied special hospitals are included, but almost all infants are born in short-stay hospitals.
Hospital fatality rate	The number of hospital deaths in 1978 divided by the number of discharges, including deaths, in 1978.	Same as for the United States.

Table VII. Health status terms

Characteristic	*United States*	*Canada*
Death rate	The ratio of the number of deaths during 1978 to the number of persons in the population. The estimate of resident population on July 1, 1978, as revised after the 1980 census was used to compute death rates.	Same as for the United States, except that the estimate of the resident population on June 1, 1978, as revised after the 1981 census was used to compute death rates.
Infant mortality rate	The ratio of the number of 1978 deaths of live-born children who have not reached their first birthday to the number of live births in 1978.	Same as for the United States.
Disability days	Days persons had to reduce their usual activities because of illness or injury. Includes days spent in bed, days in which school or work was missed or housework could not be undertaken, and days when persons had to cut down on usual activities, though not abandon them completely.	Same as for the United States.
Bed days	Days persons spent most or all of their time in bed because of illness or injury, including days spent in a hospital.	Same as for the United States.
Limitation of activity	Inability to perform all the usual activities of the population group throughout the year because of health condition. For children, limitations are in the amount or kind of school or play activities. For adults, limitations are in ability to work, do housework, or engage in social and recreational activities.	Same as for the United States.
Noninstitutionalized population	Population excluding persons living in long-term care institutions. The civilian noninstitutionalized population was used in tables L and BB–GG. It was estimated based on the sample of households in the National Health Interview Survey, with overall totals by age and sex adjusted to independent estimates from the Bureau of the Census.	Population excluding persons living in long-term care institutions. The noninstitutionalized population was used in tables L and BB–DD.
Cause of death	The underlying condition to which death is attributed, based on the information reported on the death certificate and utilizing the international rules for selecting the underlying cause of death from the reported conditions.	Same as for the United States.
Neonatal mortality rate	The ratio of the number of 1978 deaths of live-born children who have not reached their 28th day of life to the number of live births in 1978.	Same as for the United States.

Table VIII. Health services terms

Characteristic	*United States*	*Canada*
Hospital bed	The average number of beds and cribs, including pediatric bassinets, isolettes, and neonatal intensive care units, but excluding bassinets for regular care of newborn infants, set up and staffed for use by inpatients during the year. Includes all such beds in non-Federal short-stay hospitals registered with the American Hospital Association. Any institution that meets the requirements may be registered, if it desires, whether or not it is a member of the association. The requirements for registration include that the institution have at least 6 inpatient beds, an organized medical staff, registered nurse supervision, a medical record system, pharmacy, food service, and appropriate diagnostic and treatment facilities. In 1978, only 1.6 percent of all U.S. hospital beds were in nonregistered hospitals.	Beds and cribs, excluding newborn bassinets and incubators in neonatal units and regular and special care nurseries. The beds referred to in tables T and U are beds staffed and available for use at the end of the reporting period in short-stay hospitals. In table Y, the beds are beds approved for all general and allied special hospitals, except the rehabilitation, convalescence, extended care, and chronic care hospitals. The excluded hospitals are almost all hospitals with average lengths of stay of 30 days or more.
Pediatric bed	The average number of beds and cribs in pediatric units set up and staffed for use by inpatients during the year. In table T, pediatric beds refers to such beds in non-Federal short-stay hospitals registered with the American Hospital Association. Because not all of these hospitals reported whether they had pediatric beds, an adjustment was made in the data for nonreporting: For each of the 8 bed-size categories shown in table U, the number of nonreporting hospitals was multiplied by the percent of reporting hospitals with pediatric units to obtain an estimated number of nonreporting hospitals with pediatric units. The average number of pediatric unit beds in each bed-size category was then multiplied by the estimated number of nonreporting hospitals with pediatric units in the bed-size category. The result, the estimated number of pediatric beds in nonreporting hospitals, was added to the reported total. The adjustment increased the number of pediatric beds by 4.7 percent. In table W, pediatric beds refers to the pediatric beds in all reporting hospitals registered with the American Hospital Association. Federal and long-term hospitals are included, but they account for less than 4 percent of all pediatric beds. No adjustment was made for nonreporting.	Beds and cribs in pediatric units at the end of the reporting period. In table T, pediatric beds refers to such beds staffed and available for use in short-stay hospitals. In table Y, pediatric beds refers to the beds approved for pediatric units in general and allied special hospitals, excluding the rehabilitation, convalescence, extended care, and chronic hospitals, which are almost all hospitals with an average length of stay of 30 days or more.
Physician	An active doctor of medicine practicing in the 50 States or the District of Columbia on December 31, 1978, excluding those who are employed by the Federal Government and those whose addresses are unknown. In table T, active doctors of osteopathy are also counted as physicians.	An active doctor of medicine practicing within the country on December 31, 1978, excluding those who are in the military and those whose addresses are unknown.
Pediatrician	In table T, medical doctors certified as pediatricians by specialty boards by December 31, 1977. In table W, active non-Federal medical doctors	In both tables T and Y, an active civilian medical doctor certified by a specialty board as a pediatrician. Pediatrician in table T refers to those certified

Table VIII. Health services terms—Con.

Characteristic	*United States*	*Canada*
	who report as of December 31, 1978, that they spend most of their time practicing pediatrics, excluding residents in pediatric training.	by December 31, 1977, and in table Y to those certified by December 31, 1978.
Pediatric unit	Units for the general medical and surgical care of children, usually for patients 14 years of age and under, but the upper age limit can vary from hospital to hospital.	Same as for the United States.
Geographic division	The 50 States and the District of Columbia are grouped by the Bureau of the Census into 9 divisions as follows: • New England: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut • Middle Atlantic: New York, New Jersey, Pennsylvania • East North Central: Michigan, Ohio, Illinois, Indiana, Wisconsin • West North Central: Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas • South Atlantic: Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida • East South Central: Kentucky, Tennessee, Alabama, Mississippi • West South Central: Arkansas, Louisiana, Oklahoma, Texas • Mountain: Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada • Pacific: Washington, Oregon, California, Hawaii, Alaska	For this report each Province was considered a division, except the 2 smallest, Prince Edward Island and Newfoundland, which were combined to form 1 division.
Population	An estimate of the civilian population, as revised after the 1980 census, was used in table T and parts of table W. Revised estimates were not available by division for the population under 15 years of age. Therefore, it was necessary to use the civilian noninstitutionalized population as estimated before the 1980 census for table Z and for rates per 10,000 population under 15 years of age in table W. The noninstitutionalized population was used in tables BB–GG.	In tables T, Y, and AA, an estimate of the resident population, as revised after the 1981 census. The noninstitutionalized population was used in tables BB–DD.
Physician contact	Consultation with a physician about the patient's health, including consultations with medical doctors, osteopaths, and nurses or other persons acting under a physician's supervision. For physician contact in a year (table CC), a physician visit to a hospital inpatient could be counted, but such visits were excluded from the average annual number of physician contacts (table DD) and place of physician contact (table BB). Place of physician contact also excluded telephone contacts with physicians, which were included in the other tables.	Same as for the United States, except that only consultations with medical doctors are included.

Table VIII. Health services terms—Con.

Characteristic	*United States*	*Canada*
Private health insurance	Health insurance provided by non-Government sources including consumers, insurance companies, private industry, and philanthropic organizations.	Not applicable.
Medicare	A nationwide health insurance program providing health insurance protection to people 65 years of age and over, people eligible for social security disability payments for more than 2 years, and people with end-stage renal disease, regardless of income.	Not applicable.
Medicaid	A joint Federal-State welfare program available in virtually all States that provides medical benefits for low income persons, including the aged. To qualify for the program, a person must meet each State's definition of "low income."	Not applicable.
Military	Health care programs of the Veterans Administration (VA) and military services. VA benefits are potentially available to all honorably discharged veterans, but priority is given to veterans with a service-connected disability and to those receiving a pension from the VA. Military services provide benefits to eligible dependents of active military personnel and to military pensioners and their dependents.	Not applicable.
Family income	A family consists of all people within a household related to each other by blood, marriage, or adoption. Each member of the family is classified according to the total income of the family of which he or she is a member. Unrelated individuals are classified according to their own income. Family income is the total income received by the members of a family (or by unrelated individual) in the 12 months prior to being interviewed in the National Health Interview Survey, including wages, salaries, rents from property, interest, dividends, profits, and fees from their own business, pensions, and help from relatives.	Not applicable.
Hospital episode	A continuous period of stay of 1 night or more in a hospital as an inpatient, except the period of stay of a well newborn infant.	Not applicable.

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